THE FAUNA OF BRITISH INDIA,

INCLUDING

CEYLON AND BURMA.

Published under the authority of the Secretary of State for India in Council.

EDITED BY W. T. BLANFORD.

FISHES.—Vol. I.

BY

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LONDON:

TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

CALCUTTA: THACKER, SPINK, & CO. | BOMBAY: THACKER & CO., LIMITED.

BERLIN: R. FRIEDLÄNDER & SOHN, 11 CARLSTRASSE.

1889.

ALERE FLAMMAM.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

INTRODUCTION.

The present work is chiefly an abridgment of the author's 'Fishes of India,' published in 1876–78. Several additions and alterations have been made, most of which were published in 1888, in a Supplement to the work just mentioned. The synonymy, having been already quoted in full, has not been repeated in these volumes, but under each species will be found a reference to the original specific description, and to the page in the 'Fishes of India' where full details are given. The illustrations in the present work are, with very few exceptions, copies of those in the 'Fishes of India.'

The state of Dr. Day's health has unfortunately prevented him from correcting the proofs of the present publication beyond the middle of the first volume, and it is probable that some mistakes or omissions may have escaped detection in consequence. The manuscript of the work had been prepared before the author's health gave way; but some additional compression was required, and this the editor has carried out to the best of his ability.

The limits of the area of which the freshwater fauna is here

described have been already defined in the Introduction to the volume of Mammals belonging to the same series ('The Fauna of British India'), and are those of British India and its dependencies, such as Burma, the Andaman and Nicobar Islands, Manipur, Nepal, Kashmir, Baluchistan, &c., together with Ceylon. The marine fishes included are all known to inhabit the seas around British India.

ABBREVIATIONS.

I. FINS.

D.—Dorsal: the fin or fins along the back. The numerals following the letter in this and other fins indicate the number of fin-rays of various kinds. Numerals separated by a *horizontal* line signify variation in the number; an *oblique* line indicates a distinction into two different kinds of rays, the anterior being generally spines or unbranched rays, the posterior branched rays; a *vertical* line implies that the numbers on the two sides of it refer to two distinct dorsal fins. The first number or numbers refer to anterior fins or rays.

Thus D. 7–8 | 1/10–12 means that there are two dorsal fins, the first consisting of 7 or 8 rays all of one kind (probably spines), the second of one ray at the commencement, or anterior end, of the fin of one kind (spine), followed by from 10 to 12 rays of another kind (branched rays).

A.—Anal: the fin (occasionally, but not often, more than one) along the lower border of the body behind the vent. This, like the dorsal, is often composed partly of unbranched rays or spines, partly of branched rays.

C.—Caudal: the fin at the end of the tail.

The above are known as *vertical fins*.

P.—Pectoral fins, one on each side, inserted immediately behind the gill-opening. They are homologous with the fore limbs in other Vertebrata.

V.—Ventral fins, one on each side, very rarely united, inserted lower on the body than the pectoral fins, and known as *abdominal* if situated

behind the pectorals, *thoracic* if below them, *jugular* if before them in position. The ventrals correspond to the hind limbs of Batrachians, Reptiles, Birds, and Mammals.

The ventrals and pectorals are called *paired* or *horizontal fins*.

II. OTHER PARTS OF THE BODY.

B.—Branchiostegal rays (see cut of Perch's head on p. vii). Bony rays supporting the membrane within the gill-cover that serves to close the gill-opening. They are attached to the lower portion of the hyoid arch.

L. l.—Lateral line: a series of perforated scales running along each side in most Teleostean fishes, and generally conspicuous. The numeral represents the number of scales in the lateral line; two numerals with a horizontal line between represent the known extremes of variation: thus L. l. 50–55 means that the number of scales on the lateral line is known to vary from fifty to fifty-five.

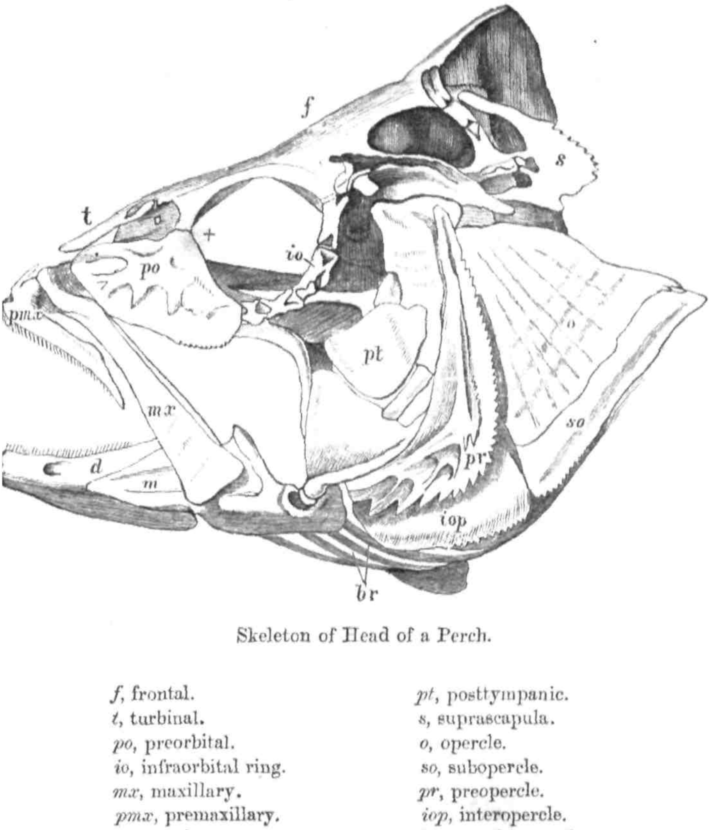
L. r.—The number of transverse rows of scales between the head and caudal fin. When two numerals are given, thus 88/66, the first represents the number of scales above the lateral line, the second that below. When three numbers are given, as 50/48/45, the second figure enumerates the scales on the lateral line, the first those above, and the third those below.

L. tr.—The number of longitudinal rows of scales between the back and abdomen, usually counted, unless some other part of the side is specified, from the anterior end of the dorsal fin to the ventral.

Cæc. pyl. *or* C. p.—Pyloric cæca or pyloric appendages; sacs attached to the duodenum. They may be seen, on opening a fish, just beyond the pyloric end of the stomach.

Vert.—Vertebræ. The first numeral signifies abdominal, the second caudal vertebræ. Thus Vert. 10/14 implies 10 abdominal vertebræ, 14 caudal. The abdominal vertebræ are those between the head and the point of suspension of the anal fin; the majority support ribs, and in none do the parapophyses or processes, one attached low down on each side, unite below to form a hæmal spine. The caudal vertebræ have a hæmal spine below corresponding to the neural spine above.

The terms applied to the head-bones are largely used in descriptions of Acanthopterygians. The accompanying woodcut, representing the skeleton of a Perch's head, and copied from Cuvier and Valenciennes's great work on Fishes, shows the position and names of the principal bones affording generic and specific characters.



Skeleton of Head of a Perch.

f, frontal.
t, turbinal.
po, preorbital.
io, infraorbital ring.
mx, maxillary.
pmx, premaxillary.
m, mandible.
d, dentary bone.
pt, posttympanic.
s, suprascapula.
o, opercle.
so, subopercle.
pr, preopercle.
iop, interopercle.
br, branchiostegal rays.

There are a few other words of frequent use in descriptions of Fishes that require explanation.

Pseudobranchiæ are a series of laminæ attached, in many Teleostean fishes, to the inside of the gill-cover opposite the gills, and are the remains of a

gill which was functional during embryonic life. Whenever present, they may be detected by turning back the gill-cover. In Chondropterygian fishes the pseudobranchiæ are differently situated, within the spiracles.

Gill-rakers.—Horny processes on the inside of the branchial arches or bony supports to the gills.

Lower pharyngeal bones.—The dwarfed fifth pair of branchial arches; the 4 anterior pairs bearing gills. These bones often support teeth.

Isthmus.—The small space beneath the throat between the two gill-openings.

Teeth.—There are several kinds of teeth in fishes. Those of the upper jaw are borne by the premaxillary bones, there being no teeth in the maxillaries; the lower-jaw teeth are attached to the dentary bone of the mandible. Besides these, teeth (*vomerine*) are often found on the vomer situated in the middle of the roof of the mouth, articulating on each side in front with the maxillary bones, and behind on each side with the palatines, which also bear teeth in many fishes. Teeth likewise occur on other bones of the skull or hyoid apparatus, or on the tongue. *Villiform* teeth are very fine conical teeth arranged in a band; *cardiform* teeth are coarser or mixed with coarser teeth.

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PISCES.

VERTEBRATE animals adapted for an aquatic life, having their extremities modified into fins; respiring, almost invariably, solely by means of gills *; possessing a heart with only two (in one instance three) cavities, and being cold-blooded. They are scaleless, or partially or wholly scaled, the scales being sometimes in the form of osseous plates.

Synopsis of Subclasses occurring in India.

Skeleton cartilaginous. Skull without cranial sutures. Gills attached by their outer edges to the skin, with a gill-opening intervening between every two gill-laminæ. Conus arteriosus contractile. Optic nerves not or only partially decussating. A spiral valve to intestines.
I. CHONDROPTERYGII.

Skeleton osseous. Skull with cranial sutures. Vertebræ completely separated, and the posterior extremity of the vertebral column bony, or having bony plates. Branchiæ free, and the water discharged through a single aperture on each side, protected by a bony gill-cover or opercle; branchiostegal rays present. A non-contractile bulbus arteriosus, having a pair of valves at its commencement. Optic nerves decussating.
II. TELEOSTEI.

Skeleton membrano-cartilaginous and notochordal. Skull and brain absent. Pulsating sinuses present in place of a heart.
III. LEPTOCARDII.

---

* Certain fish, as the *Labyrinthici* and *Ophiocephalidæ*, provided they are able to obtain direct access to atmospheric air, can live in water even with a bandage fastened round their gill-covers, entirely preventing their gills being employed for respiratory purposes. Such a proceeding would, however, be fatal to the majority of fishes, thus showing that some forms possess means of depurating their blood which are n ot present in all.

Subclass **CHONDROPTERYGII.**

Skeleton cartilaginous; no cranial sutures. From one to seven external gill-openings on each side; the gills are attached by their outer edges to the skin, with a gill-opening intervening between each two laminæ; no gill-cover. Two or more series of valves at the conus arteriosus. The optic nerves, although united, do not decussate, or do so only slightly. Body with vertical and paired fins, the posterior pair abdominal; caudal fin with an elongated upper lobe. Intestines with a spiral valve. Male sex with intromittent organs attached to the ventral fins. Ovaries containing large ova, which are fertilized, and sometimes likewise developed internally. Embryo with external deciduous gills. No air-bladder.

This subclass includes the sharks, rays, and chimæras, and is divided into two orders, the second of which does not appear to have representatives in India. Geologically speaking, these fishes existed prior to the Teleosteans.

Synopsis of Orders.

Five to seven external gill-openings, and no cartilaginous gill-cover. Jaws distinct from the skull	1. *PLAGIOSTOMATA.*
A single external gill-opening having a rudimentary cartilaginous gill-cover; four branchial clefts inside the gill-cavity. Palatal and maxillary apparatus attached to the skull	2. *HOLOCEPHALA.*

Order I. PLAGIOSTOMATA.

Syn. *Elasmobranchii.*

Body more or less cylindrical or depressed; the trunk may or may not pass gradually into the tail. From five to seven gill-openings, which may be lateral or inferior. Jaws distinct from the skull.

This order has been subdivided as follows:—

A. Trunk gradually passing into the tail. Gill-openings lateral .. SELACHOIDEI or Sharks.
B. Gill-openings inferior. Pectoral fins largely developed and constituting a flat disk .... BATOIDEI or Skates and Rays.

These fish are employed as food, and portions of them, especially the fins, are largely exported from the Indian to the Chinese markets. In China Dr. Cantor observed that the fins were not exclusively selected from the sharks, *Selachoidei*, but equally from the rays, *Batoidei*. Among those examined at Pinang were found to be fins taken from fishes belonging to the following genera:—*Carcharias*, *Zygæna*, *Stegostoma*, *Pristis*, *Rhinobatus*, *Trygon*, and *Myliobatis*. Gelatine is obtained from the larger fins, glue from the smaller. All except the caudal fins are cut from the fish at the root, so as to leave as little flesh as possible. The root is dipped into wetted lime (Chunam) and then the fins are dried in the sun, and according to their value they are divided into two kinds, "white" and "black." The white consist exclusively of the dorsal fins, which are on both sides of a uniform light colour, and expected to yield more gelatine than the other fins. The pectoral, ventral, and anal fins pass under the denomination of black fins; the colour, however, varies from buff to grey or brown, and most of them are of two different colours, the upper surface being dark and the lower light. The black fins of course are the most numerous, and supposed to yield a comparatively small quantity of gelatine.

Suborder A. *SELACHOIDEI.*

Body more or less cylindrical, the trunk gradually passing into the tail. Gill-openings lateral. The gills in these fishes are not situated in a common cavity but in separate sacs that do not communicate one with another. In those which possess five sacs

the four anterior ones are lined in front with parallel rows of adherent gills, whilst in the fifth these processes are found solely on its proximal side. Water taken in by the mouth for respiratory purposes passes backwards through the pharyngo-branchial slits into these sacs, from whence it emerges by the external gill-openings or stigmata. The scapular arch, which is suspended to the front part of the vertebral column, divides these respiratory sacs from the abdominal cavity. Although opercular pieces are absent, cartilaginous rings are sometimes present surrounding the gill-openings.

The size to which these fish attain is not an invariable index to their character, which is better shown by an examination of the teeth with which they are armed. Some powerful forms have small teeth, whilst the obtuse teeth of particular genera are more calculated for crushing shells and crustacea than for waging war with other fishes. The scales are peculiar, being generally small papillæ that have a coating of enamel: this, under the designation of shagreen, is sometimes employed in certain trades, as for covering small boxes or the scabbards of swords, or even for smoothing down wood. The tail-fin is flexible and of great power, terminating much like the blade of an oar, and giving the bearer great facilities in pursuit; when seizing their prey, if it is large, sharks generally turn on one side.

When breeding, a congress takes place between the sexes, the arrangement of the sexual organs being somewhat similar to what obtains among the higher vertebrates. The male organs are compact, placed far forwards in the abdominal cavity, while attached to the ventral fins are claspers which have intromittent functions. In the females, different parts of the oviduct may be functionally modified, for although the ova are fertilized within this oviduct, the development of the young is not invariably carried out on the same plan, some being perfected prior to extrusion, while in others the ovum is encased in a horny covering and so deposited in the sea. In such forms as produce their young alive, a modified placenta exists.

Geographical Distribution. Sharks are spread throughout the seas and estuaries of cold, temperate, and tropical regions, being most numerous in the last; and some ascend rivers even far beyond the influence of the tides *. They are common along the coasts of India, and some species have a wide range, although they do not appear to descend to any great depth. They seem to scent blood or offal from long distances, but their carrying off human prey is

* Not only sharks but saw-fishes occasionally reside in pieces of fresh water, when the communication with the sea has been cut off. Professor Meyer ('Nature,' Dec. 30, 1875) remarked on this subject that "an accurate comparison (between marine and freshwater forms) showed no difference at all, and therefore the changed conditions seem to have had no influence on the external features of the species."

not of frequent occurrence. Among the most savage species are the ground-sharks of the rivers, as *Carcharias gangeticus*, which seldom loses an opportunity of attacking the bather. The *Galeocerdo rayneri* is likewise greatly dreaded along the coast or in the harbours. Though stationed several years at Cochin, I could only ascertain a single instance of a living human being having been carried off by these fishes, and Col. Tickell mentions that while in Burma for many years he only heard of one such case. The most frequent accidents occurring are after the fish has been hooked and lifted into the fisherman's boat, or else while entangled in a net when attempts are made to seize it or cut it adrift. Corpses are almost immediately eaten by sharks, while it may be said in their favour that they devour the poisonous sea-snakes (*Hydrophidæ*).

Along the coast of Sind, as at Kurrachee, there are considerable shark-fisheries, one form, the Mhor, being harpooned while basking on the surface, and Dr. Buist observed in 1850 that this species was often captured 40 and sometimes 60 feet in length. The largest shark I saw there in 1870 was about 20 feet long, but I was told that others up to 30 feet had been recently taken. Here sharks are likewise netted, the nets being a quarter of a mile or more in length, constructed of strong twine and having a six-inch mesh; floats of light wood are affixed along the upper line, while the lower edge of the net is weighted by stones. These nets are sunk in deep water (from 80 to 150 feet) and well out to sea, where they remain until the following day; they are set two or three times a week according to the weather and local circumstances. Small sharks are eaten by the lower classes, and their flesh is considered along the Malabar coast as very nourishing food for mothers after childbirth, while in Bombay they are largely purchased by the African sailors.

The fins of the sharks are removed and dried in the sun. Strips of flesh are also salted as food, and the livers boiled down for the oil they contain. Fins of sharks and rays, along with fish-maws or fish-sounds, were exported from Kurrachee to Bombay during the 5 years ending 1872–73 to the declared annual average value of about £7415; from Bombay they were re-exported to China. Some forms of large sharks, as *Galeocerdo*, which have the edges of their broad teeth sharp or coarsely serrated, cannot be captured by nets, as they at once cut their way out. But nets are suitable for such species as possess conical teeth; these last may likewise be taken by baited hooks attached to cords composed of many strands, through which the teeth penetrate but do not cut.

Further down the Western coast, as at Calicut, medicinal fish-liver oil of an excellent quality was formerly manufactured, a small factory for this purpose having been constructed at that station in 1854, and the livers of sharks and saw-fishes were purchased from the fishermen. The abundance or paucity of these fishes evidently depended to a very great extent upon whether sardines were or were not present, for these latter forms of *Clu-*

peidæ are very capricious, sometimes forsaking the coast for several successive years, and then as suddenly reappearing in countless millions (see *Clupea longiceps*). No livers under 40 lb. weight were accepted at the factory, as the larger ones gave proportionally a greater amount of oil than the smaller ones; sometimes livers of a great size were purchased. One weighed 290 lb., and another from a female saw-fish 14 feet long 185 lb.

The division Selachoidei among the Plagiostomata has been further subdivided into nine families, the following only of which have as yet been recorded from the seas of India:—

I.	A nictitating membrane to eye; two dorsals and an anal fin	**Carchariidæ.**
II.	No nictitating membrane to eye; two dorsals and an anal fin; nostrils not confluent with mouth, which last is inferior. Spiracles absent or minute.	**Lamnidæ.**
III.	No nictitating membrane to eye; two dorsals and an anal fin. Mouth near the extremity of the snout. Teeth small and conical	**Rhinodontidæ.**
IV.	No nictitating membrane to eye; only one dorsal and an anal fin	**Notidanidæ.**
V.	No nictitating membrane to eye; two dorsals and an anal fin. Mouth inferior. Teeth small, several rows being generally in use at the same time	**Scylliidæ.**

Family I. CARCHARIIDÆ.

The snout may be produced longitudinally or laterally. Spiracles absent or present. Eye with a nictitating membrane. A small pit may or may not exist above the root of the tail, and a groove at the angle of the mouth may be present or absent. Mouth crescentic, inferior. The teeth may be erect or oblique, with a single cusp, having smooth or serrated edges; or they may be small, the cusps being obsolete; or with one central and one or two lateral cusps. The first dorsal fin, destitute of a spine, is placed opposite the interspace between the pectoral and ventral; anal fin present.

The most abundant species of this family along the coasts of India undoubtedly are such as belong to the genus *Carcharias*, the immature of which are very destructive to herrings and other edible fishes. It has been observed that one of the remarkable results which has followed the construction of the Suez Canal has been the introduction into the Mediterranean sea of sharks, which were formerly almost unknown there.

The number of species of this family found in the Red Sea by Klunzinger, as recorded in his 'Synopsis der Fische des Rothen Meeres' in 1871, was as follows:—*Carcharias* 6, *Loxodon* 1, *Galeocerdo* 2, *Dirrhizodon* 1, which does not show that these fishes are a large element in the fish-fauna. As, however, the more open Indian Ocean is reached, the number of these destructive fishes largely

increases, and innumerable young swarm along the shores, while they are exceedingly numerous off the low coast and muddy seas of Burma. In fact I shall have to describe double the number of forms given by Klunzinger: *Carcharias* 17, *Hemigaleus* 1, *Galeocerdo* 2.

Synopsis of Genera.

First group. CARCHARIINA.

Snout produced longitudinally. Teeth erect or oblique, with a single cusp, which has smooth or serrated edges. A pit at the base of the caudal fin.

No spiracles .... 1. CARCHARIAS.
Spiracles small. Distinct labial folds. Teeth serrated or notched in the upper jaw. Caudal fin with a single notch .... 2. HEMIGALEUS.
Spiracles small. Teeth serrated in both jaws. Caudal fin with a double notch .... 3. GALEOCERDO.

Second group. ZYGÆNINA.

Head produced laterally into the shape of a hammer. Nostrils on front edge of head. Teeth oblique, with a single cusp, having sharp smooth edges. A pit at the base of the caudal fin.

Spiracles absent .... 4. ZYGÆNA.

Third group. MUSTELINA.

Teeth small, obtuse, or having a central and one or two smaller lateral cusps.

Spiracles small; labial folds well developed. Teeth obtuse. No pit at base of the caudal fin........ 5. MUSTELUS.
No spiracles. A pit at base of the caudal fin........ 6. TRIÆNODON.

First group. CARCHARIINA.

1. Genus **CARCHARIAS**, Müller & Henle.

Syn. *Scoliodon*, *Aprion* or *Aprinodon*, *Physodon*, *Hypoprion*, *Prionodon*, Müller & Henle; *Prionace*, Cantor; *Eulamia*, *Isogomphodon*, *Lamiopsis*, *Platypodon*, *Hypoprionodon*, *Isoplagiodon*, and *Cynocephalus*, Gill.

No spiracles. A pit before the root of the caudal fin. Snout longitudinally produced. Mouth crescentic or angular; the labial fold or groove rarely extends beyond the angle of the mouth. Teeth erect or oblique, with a sharp more or less compressed cusp, sometimes triangular, the edges of which may be serrated or smooth *. The first dorsal fin, destitute of a spine, is placed

* In some forms these characters alter considerably with age.

opposite the interspace between the pectoral and ventral; caudal with a distinct lower lobe.

Respecting the colours in these fishes, I have observed that black spots or marks on the fins frequently become fainter in examples which have been preserved some time in spirit, more especially if they have been removed from the alcohol and permitted to dry.

The fishes constituting this large and widely distributed genus have been subdivided by some authors into several genera, by others into the like number of subgenera or divisions, which latter is the course that I have adopted.

Synopsis of Indian Species.

A. Teeth with smooth edges; all oblique and without swollen bases. (*Scoliodon.*)

Pectoral fin not reaching to below dorsal; length of base of anal nearly equalling its distance from the ventral; second dorsal posterior to base of anal. Groove at angle of mouth not extending on to the upper jaw .... 1. *C. laticaudus*, p. 9.

Pectoral fin reaching to below origin of dorsal; length of base of anal nearly equalling half its distance from the ventral; second dorsal over end of base of anal. Groove at angle of mouth not extending on to the upper jaw ...... 2. *C. acutus*, p. 10.

A well-marked groove at the angle of the mouth extending a short distance along both jaws .... 3. *C. walbeehmi*, p. 10.

B. Teeth with smooth edges; those in the centre of the lower jaw smaller than those at the side, the latter swollen at their bases and having an oblique and narrow cusp. Upper teeth flat and oblique. (*Physodon.*)

Snout elongated: end of base of first dorsal above origin of ventral; second dorsal small and posterior to the base of anal .... 4. *C. mülleri*, p. 11.

C. Teeth with smooth edges; all narrow and standing on a broad base, the upper erect or slightly oblique; the lower erect. (*Aprionodon.*)

Second dorsal as large as the anal and nearly equal in size to the first dorsal. Nostril with a distinct valve inferiorly. Teeth $\frac{27-29}{27-29}$ .... 5. *C. acutidens*, p. 11.

D. Teeth with smooth edges, except the bases of the upper ones, which are serrated. (*Hypoprion.*)

Snout pointed. The bases of the teeth in the upper jaw serrated on both sides .. 6. *C. macloti*, p. 12.

Snout rounded. Only the outer sides of the bases of the upper teeth serrated .... 7. *C. hemiodon*, p. 12.

E. Some or all of the teeth serrated both on their bases and on their cusps. (*Prionodon.*)

Teeth in both jaws serrated. Second dorsal much shorter than anal .... 8. *C. sorrah*, p. 12.

Teeth in both jaws serrated. Second dorsal not much smaller than the anal. Fins darkish with light edges .... 9. *C. dussumieri*, p. 13.

Snout obtuse. Teeth in both jaws serrated. 10. *C. gangeticus*, p. 13.

Teeth in both jaws serrated. All the fins black-edged .... 11. *C. melanopterus*, p. 14.

Fins, except the first dorsal, with black extremities .... 12. *C. bleekeri*, p. 15.

Teeth coarsely serrated in upper jaw; awl-shaped in lower, some with a basal cusp .... 13. *C. ellioti*, p. 15.

Upper teeth serrated. Second dorsal opposite to but larger than the anal. A black spot on the second dorsal .... 14. *C. murrayi*, p. 16.

Upper teeth serrated. Second dorsal opposite the anal. A black spot on second dorsal .... 15. *C. menisorrah*, p. 16.

Upper teeth serrated and on rather a broad base; lower more slender. Ends of some of the fins black .... 16. *C. limbatus*, p. 17.

Teeth in both jaws slender, and from thirty-six to forty in number .... 17. *C. temminckii*, p. 17.

1. (1.) **Carcharias laticaudus.** (Fig. 1.)

Carcharias (Scoliodon) laticaudus, *Müll. & Henle, Plagios.* p. 28, t. viii.

Carcharias laticaudus, *Day, Fish. India*, p. 712, pl. clxxxviii, fig. 1 (see synonymy).

Dan-da-nee, Sind.; *Nullian sorrah* and *Palah sorrah*, Tel.

Length of preoral portion of snout exceeding the width of the mouth by one fifth, and equal to or slightly more than the distance

Fig. 1.—*Carcharias laticaudus.*

between the eye and the first gill-opening (longer in the immature); the groove at the angle of the mouth scarcely extends on to the upper jaw. Nostrils very much nearer to the mouth than to the end of snout. *Teeth*—those in upper jaw rather oblique, not swollen

at their bases: those in the lower jaw very oblique, especially near the symphysis: none are serrated. *Fins*—the length of the base of the anal fin is nearly or quite equal to its distance from the ventral: the pectoral does not extend so far as to below the origin of the dorsal; its posterior edge is nearly straight, its internal edge one third of the length of its outer margin. The length of the caudal fin is contained $3\frac{2}{3}$ to 4 times in the total length, but is rather more in adults than in immature specimens. *Colour*—uniform grey superiorly, white beneath: the pectoral of a deep grey, having a white outer edge, as have also the ventral and anal; posterior portion of caudal fin dark grey or nearly black.

Hab. Seas of India to the Malay Archipelago and beyond. This species attains to at least two feet in length.

2. (2.) Carcharias acutus.

Carcharias acutus, *Rüppell, N. W. Fische*, p. 65, t. xviii, f. 4; *Day, Fish. India*, p. 712, pl. clxxxiv, fig. 3 (see synon.).

Purrooway sorrah, Tam.; *Parl sorrah*, Mal.; *Sem sorrah*, Tel.

Length of preoral portion of snout one fourth longer than the gape of the mouth, and equal to or slightly less than the distance between the eye and the gill-opening: a groove at the angle of the mouth not, or but slightly, extending on to the upper jaw. Nostrils nearer to mouth than to the end of the snout. *Teeth*—the upper and lower ones oblique, without swollen bases and none serrated. *Fins*—the length of the base of the anal fin is one half its distance from the ventral or less: the pectoral extends to at least below the origin of the dorsal, its posterior edge is concave, and its internal edge about two fifths the length of its outer: second dorsal small, situated over the posterior half of the anal. Length of caudal fin contained about $3\frac{1}{2}$ to $3\frac{2}{3}$ times in the total length. *Colour*—grey or bronze above, white below: fins grey, the posterior edge of pectoral, outer edges of ventral, anal, and posterior half of caudal, white; upper edge of caudal dark, as is also its posterior lobe.

Hab. Red Sea, seas of India to the Malay Archipelago, and beyond; said to attain to a considerable size.

3. (3.) Carcharias walbeehmi.

Carcharias (Scoliodon) walbeehmi, *Bleeker, Nat. Tyds. Ned. Ind.* x, p. 353.

Carcharias walbeehmii, *Day, Fish. India*, p. 712, pl. clxxxv, fig. 2 (see synon.).

Ei-dah, Andamanese.

Length of the preoral portion of the snout exceeding the width of the mouth by nearly one third, and equalling the distance between the eye and the second gill-opening. A well-marked groove at the angle of the mouth extending on to the upper jaw and along a portion of the mandible. Nostrils rather nearer to the

mouth than to the end of the snout, the distance between the outer edges of the nostrils equal to the extent between them and the end of the snout. *Teeth*—oblique and flat in both jaws, without any serration. *Fins*—the pectoral extends to nearly beneath the middle of the first dorsal fin, it has its posterior edge rather concave, and its inner edge equals one third of the length of its outer; second dorsal rather small, with its posterior lobe produced, it is situated over the last half of the anal. Length of the base of the anal equal to two fifths of its distance from the base of the ventral: caudal fin $3\frac{1}{2}$ times in the total length. *Colour*—light brown superiorly, becoming dull white beneath. Fins grey and mostly with light outer edges.

Hab. Seas of India to the Malay Archipelago and Japan.

4. (4.) **Carcharias mülleri.**

Carcharias mülleri, (*Valenciennes*) *Müll. & Henle, Plagios.* p. 30, t. xix, f. 1 (teeth); *Day, Fish. India,* p. 713 (see synon.).

Snout elongated and pointed. Nostrils nearer to the angle of the mouth than to the end of the snout. Mouth nearly as long as wide. *Fins*—the end of the base of the first dorsal situated opposite the origin of the ventral; second dorsal very small and commencing above the last third of the base of the anal. Pectoral extending to below the origin of the first dorsal. *Colour*—brownish, becoming lighter beneath; fins a little darker.

Hab. Bengal.

5. (5.) **Carcharias acutidens.**

Carcharias acutidens, *Rüppell, N. W. Fische*, p. 65, t. xviii, fig. 3; *Day, Fish. India,* p. 713, pl. clxxxix, fig. 1 (see synon.).

Snout obtuse and rounded, the length of its preoral portion equal to two thirds of the width of the mouth and much less than the distance between the eye and the first gill-opening. Nostrils rather nearer mouth than to the end of the snout. A very short groove at the angle of the mouth not extending on to the upper jaw. Eye small. Gill-openings much wider than the orbit. *Teeth* $\frac{27\text{–}29}{27\text{–}29}$ *, those in both jaws rather slender, erect or oblique, and with the bases rather swollen; none serrated. *Fins*—the base of the first dorsal situated midway between the inner angle of the pectoral and the commencement of the ventral; second dorsal nearly as large as the first, rather larger than the anal and situated above it. Caudal fin $4\frac{1}{2}$ in the total length. Pectoral falciform, its inner edge two sevenths the length of its outer, it reaches to beneath the middle of the base of the first dorsal. *Colour*—of a dull reddish brown, becoming lightest on the sides and beneath.

Hab. Red Sea, coasts of Sind and the Indian Ocean, attaining at least to six feet in length.

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* Twenty-seven to twenty-nine teeth in each jaw.

6. (6.) Carcharias macloti.

Carcharias (Hypoprion) macloti, *Müll. & Henle, Plagios.* p. 34, t. x.
Carcharias macloti, *Day, Fish. India*, p. 713, pl. clxxxviii, fig. 2 (see synon.)

Pala sorrah and *Sorrah Kowah*, Tel.

Length of the preoral portion of the snout exceeding the width of the mouth by one third, and equalling the distance between the eye and the second gill-opening. A short groove at the angle of the mouth, not extending on to the upper jaw. Nostrils nearer to the opening of the mouth than to the end of the snout. *Teeth*—the bases of those in the upper jaw denticulated on both sides; those in the lower jaw erect, with smooth edges and a broad base. *Fins*—the length of the base of the anal is equal to about twice its distance from the origin of the ventral; the pectoral extends to nearly below the hind edge of the first dorsal, its posterior margin is rather concave, its internal equals about one third of the length of its outer edge: caudal $3\frac{1}{4}$ to $3\frac{1}{3}$ in the total length. *Colour*—grey or brown, becoming dull white beneath; the fins grey, the caudal nearly black in its posterior half; outer half of first dorsal dark; pectoral and ventral with a light edge.

Hab. Seas of India to New Guinea.

7. (7.) Carcharias hemiodon.

Carcharias (Hypoprion) hemiodon, (*Val.*) *Müll. & Henle, Plagios.* p. 35, t. xix, f. 2 (teeth).
Carcharias hemiodon, *Day, Fish. India*, p. 714 (see synon.).

Ngamán ngheppyan, Burmese.

Snout obtusely rounded; the distance between the end of the snout and the mouth equals the interspace between the outer angles of the nostrils. No groove at the angle of the mouth. *Teeth*—in the upper jaw oblique, with the outer side of their bases serrated. *Fins*—the pectoral reaches to below the middle of the first dorsal; the second dorsal commences opposite to or rather behind the origin of the base of the anal. Caudal fin $4\frac{1}{3}$ in the total length. *Colour*—grey, becoming lighter beneath.

Hab. Seas of India, ascending rivers, as the Hooghly at Calcutta.

8. (8.) Carcharias sorrah.

Carcharias (Prionodon) sorrah, (*Val.*) *Müll. & Henle, Plagios.* p. 45, t. xvi.
Carcharias sorrah, *Day, Fish. India*, p. 714, pl. clxxxv, fig. 1 (see synon.).

Length of the preoral portion of the snout about equal to the width of the mouth and nearly equal to the distance between the eye and the first gill-opening. No groove at the angle of the mouth. Nostrils about midway between end of snout and mouth. Gill-openings rather wider than the orbit. *Teeth* $\frac{25}{25}$, those in the

upper jaw oblique, serrated, and with a toothed notch on their outer edge; those in lower jaw a little oblique, rather narrow, situated on a broad base and serrated. *Fins*—pectoral falciform, extending to beneath the hind third of the base of the first dorsal fin, its internal margin equalling about one fourth or two sevenths of its outer. Origin of first dorsal slightly posterior to the base of the pectoral, and not extending to above the ventral. The second dorsal smaller than and slightly posterior to the origin of the anal, the latter rather nearer the caudal than the ventral. Caudal fin 3¼ in the total length. *Colour*—dull brown superiorly, and whitish beneath; fins grey, lower caudal lobe and pectorals with black extremities.

Hab. Seas of India to the Malay Archipelago.

9. (9.) Carcharias dussumieri.

Carcharias (Prionodon) dussumieri, (*Valenciennes*) *Müll. & Henle, Plagios.* p. 47, t. xix, f. 8.

Carcharias dussumieri, *Day, Fish. India*, p. 714, pl. clxxxvii, fig. 2 (see synon.)

Choti musi, Maráthi.

Length of the preoral portion of the snout very slightly exceeding the width of the mouth, and equalling the distance between the eye and the first gill-opening. A very short groove at the angle of the mouth, only slightly extending on to the upper jaw. Nostrils nearer the opening of the mouth than to the end of the snout. Gill-openings wider than the orbit. *Teeth* $\frac{25}{26}$, those of the upper jaw oblique and serrated, having a notch on the outer side; those in the mandibles smaller, oblique, narrow, serrated, and with a broad base. *Fins*—pectoral extends to opposite the hind edge of the base of the first dorsal, its posterior margin is slightly concave, its internal margin equals two fifths of the length of its outer edge. Origin of the first dorsal a very slight distance behind the base of the pectoral, and its base not extending to above the ventral. The second dorsal slightly smaller than the anal. The length of the caudal about 4 in the total length. *Colour*—grey or dull brown, becoming white beneath; fins grey with white outer edges; upper two thirds of second dorsal blackish.

Hab. Seas of India to the Malay Archipelago.

10. (10.) Carcharias gangeticus.

Carcharias (Prionodon) gangeticus, *Müll. & Henle, Plagios.* p. 39, t. xiii.

Carcharias gangeticus, *Day, Fish. India*, p. 715, pl. clxxxvii, fig. 1 (see synon.)

Mundah magur, Ooriah; *Nga man goung wyn*, Burmese.

Length of the preoral portion of the snout only two thirds of the width of the mouth, and equalling half of the interspace between the eye and the middle gill-opening; a very slight groove at the

angle of the mouth. Nostrils in the front half of the distance between the end of the snout and the mouth. Gill-openings wider than the orbit. *Teeth*—twenty-seven to thirty in each jaw, all serrated; the upper almost triangular, their outer edge with a notch, very distinct in the immature, but becoming almost lost with age; those in the lower jaw narrow, erect, and having broad bases. *Fins*—pectoral elongated, falciform, and extending to beneath the middle of the first dorsal; its internal margin $\frac{2}{7}$ of the length of its outer. Origin of the first dorsal slightly posterior to the hind edge of the base of the pectoral, its base not extending to above the ventral. The second dorsal of about the same size as the anal, the latter nearer to the caudal than to the ventral. Length of the caudal $3\frac{1}{2}$ in the total length. *Scales*—small and with rough edges; they are hardly above half the size of those in *C. melanopterus*. *Colour*—grey superiorly, becoming dull white beneath. Fins grey, the pectoral, ventral, and anal with white edges; posterior portion of caudal rather dark.

Hab. Seas of India to Japan, ascending rivers to above tidal influence. It is the commonest form along the Burmese coasts and attains at least nine feet in length.

This is one of the most ferocious among Indian sharks, and frequently attacks bathers even in the Hooghly at Calcutta, where it is so dreaded that a reward is offered for its destruction.

11. (11.) Carcharias melanopterus.

Carcharias (Prionodon) melanopterus, *Quoy & Gaimard, Voy. Uranie & Physicienne, Zool.* p. 194, pl. 43.

Carcharias melanopterus, *Day, Fish. India*, p. 715, pl. clxxxv, fig. 3 (see synon.)

Caval sorrah, Nella vekal sorrah, Raman sorrah, Mukhan sorrah, Boka sorrah, and *Ran sorrah*, Tel.; *Nyáman toungmé*, Arracan; *Hungur*, Chittagong.

Length of the preoral portion of the snout two thirds the width of the mouth and considerably less than the distance between the eye and the first gill-opening; a very short groove at the angle of the jaws. Nostrils nearer to the extremity of the snout than to the end of the mouth. Snout rounded and very obtuse. *Teeth* $\frac{24-25}{24-25}\left(\frac{31}{31}\right)$, the upper broad, flattened, oblique, with a very slight notch or rather concavity on the outer side and serrated; the lower much narrower, pointed, on a broad base and also serrated, these serrations being generally minute, sometimes only on one side of the tooth, and occasionally wanting, especially in the lower jaw. *Fins*—pectoral falciform, extending to beneath the middle or even hind edge of the base of the dorsal, its outer edge three times as long as its inner one. Base of first dorsal a little nearer the pectoral than its posterior end is to the ventral. Second dorsal opposite and similar to the anal. Length of caudal $3\frac{3}{4}$ to $4\frac{1}{4}$ in the total length. *Scales*—comparatively large, lineated, but with almost smooth edges. *Colour*—brown or bluish grey superiorly,

fading to dull white beneath; ends of all the fins deep black. Iris grey, stained darker superiorly. It may be remarked, as showing the size to which this species attains, that the liver of one at the Government fish-oil factory at Calicut weighed 270 lb.

Hab. Seas of India to the Malay Archipelago, and beyond. This form is very common.

12. (12.) Carcharias bleekeri.

Carcharias (Prionodon) bleekeri, *Duméril, Hist. Nat. Poiss.* i, p. 367.
Carcharias bleekeri, *Day, Fish. India*, p. 715 (see synon.).

Length of the preoral portion of the snout equal to the width of the mouth. Nostrils midway between the end of the snout and the mouth. *Teeth* $\frac{25}{23}$, the upper triangular with a slightly notched outer border; the lower nearly erect, narrow, and on a broad base. *Fins*—the dorsal commences a short distance behind the angle of the pectoral; second dorsal opposite to, nearly as long as, but lower than the anal, and elongated posteriorly. Pectoral with its upper edge $4\frac{1}{2}$ to 5 times as long as its lower; caudal one fourth of the total length. *Colour*—a deep black spot at the lower edge of the end of the pectoral fin; a second at the end of the inferior lobe of the caudal; no black spot on the first dorsal.

Hab. East coast of Africa, seas of India.

13. (13.) Carcharias ellioti.

Carcharias ellioti, *Day, Fish. India*, p. 716, pl. clxxxix, fig. 2.
Puducan or *Adugu-pal sorrah*, Tamil; *Pal sorrah*, Tel.

Length of the preoral portion of the snout equal to the width of the mouth. A well-developed labial groove along the outer side of the maxilla, and a slight one on the mandible. Eyes rather small. Nostrils rather nearer to the mouth than to the end of the snout. Gill-openings much wider than the orbit. *Teeth* $\frac{24-26}{30-34}$, the upper nearly triangular without any notch or basal enlargement, very coarsely serrated on both edges; those in the mandible obliquely erect, awl-shaped, becoming smaller and more triangular at the angle of the mouth; the awl-shaped ones have a cusp at either side of the base, below which the outer edge has a few serrations; the external triangular ones are serrated externally. *Fins*—the first dorsal commences just behind the root of the pectoral, its base being nearer to it than to the ventral; second dorsal smaller than the first, but larger than the anal, before which it commences. Pectoral falciform, its internal margin $\frac{1}{3}$ the length of its outer, the fin reaches to beneath the end of the base of the dorsal. Anal below the last two thirds of the second dorsal. Caudal $3\frac{3}{4}$ in the total length. *Colour*—grey superiorly, becoming nearly white beneath.

Hab. Seas of India. At Kurrachee it is not uncommon.

14. (14.) Carcharias murrayi.

Carcharias murrayi, *Günther, A. M. N. H.* (5) xi, p. 137 (1883); *Day, Fish. India, Supplement*, 1888, p. 809.

Snout short and obtuse; the distance between the mouth and the end of the snout being less than that between the inner angles of the nostrils. Nostrils nearly midway between the end of the snout and the mouth. *Teeth*—in the upper jaw of moderate size, the anterior equilateral, rather longer than broad, those on the side oblique with the posterior edge concave and both edges finely serrated; twenty-nine rows in the lower jaw, lanceolate, their edges smooth, with a broad base, two-rooted, and some with an additional minute lobe. *Fins*—first dorsal commences opposite the axil of the pectoral; the second only one third the size of the first, but conspicuously larger than the anal, which is small. Origin of anal behind that of the second dorsal. Pectoral large, exceeding the distance between the first gill-opening and the end of the snout; the length of its hind margin only one fourth of that of its outer. Caudal of moderate length, rather longer than the distance between the two dorsal fins. *Colour*—uniform, top of first dorsal appears to have been black.

Hab. Kurrachee, where an example 6 feet 8 inches long was captured. The specimen, which is in the British Museum, is stuffed and not in a very good condition; it seems only to differ from *C. ellioti* in the size of the second dorsal and anal fins.

15. (15.) Carcharias menisorrah.

Carcharias (Prionodon) menisorrah, (*Val.*) *Müll. & Henle, Plagios.* p. 46, t. xvii.
Carcharias menisorrah, *Day, Fish. India*, p. 716, pl. clxxxiv, fig. 1 (see synon.)

Karamoottee sorrah and *Ciga sorrah*, Tel.; *Nga man nee*, Arracan.

Preoral portion of snout nearly or quite as long as the mouth is wide; the width of the head equals the distance from the angle of the mouth to the end of the snout. A very small groove at the angle of the mouth extending a short distance on to the upper jaw. *Teeth*—twenty-eight in the upper jaw; they are oblique, triangular, notched externally, and serrated in the whole extent of their cusps; lower teeth erect, slender, lanceolate, not serrated, and having broad bases. *Fins*—pectoral not so long as head, one fifth longer than broad at its extremity, it is scarcely emarginate, its inner margin equals about half the length of the outer; base of the second dorsal slightly more than half of that of the first dorsal, it is opposite, and almost as large as the anal. Posterior end of the dorsal fin at the same distance from the ventrals as its anterior end is from the root of the pectoral. Upper edge of the caudal almost straight, its length being slightly more than the interval between its base and the origin of the ventral. *Colour*—grey above,

white below; upper half of the second dorsal generally deep black.

Hab. Red Sea to the Malay Archipelago. Attains twelve feet or more in length.

16. (16.) **Carcharias limbatus.**

Carcharias (Prionodon) limbatus, *Müll. & Henle, Plagios.* p. 49, t. xix, f. 9 (teeth).

Carcharias limbatus, *Day, Fish. India*, p. 716, pl. clxxxiv, fig. 2 (see synon.).

Length of preoral portion of the snout about equal to the width of the mouth, and slightly less than the distance between the eye and the first gill-opening; a short groove at the angle of the mouth scarcely extending on to the upper jaw. *Eyes*—small; gill-openings about twice the size of the eye. *Teeth*—erect, somewhat constricted above the base, which is broad, the upper teeth broader than the lower, although all are of somewhat similar shape, and serrated, but most distinctly in the upper jaw; in the young the teeth in the mandibles usually appear to have smooth edges, but under the microscope the rudiments of serrations are perceptible. *Fins*—the length of the base of the anal is equal to about two thirds of its distance from the base of the ventral; the pectoral extends to below or even to beyond the hind edge of the dorsal fin; the posterior edge is slightly concave; the internal edge is $\frac{3}{10}$ to $\frac{1}{3}$ the width of the outer. Dorsal commences over the inner angle of the base of the pectoral; second dorsal arises above or slightly posterior to the origin of the anal, than which it is somewhat smaller. Caudal $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Colour*—grey superiorly, becoming white on the sides and beneath. Fins dark grey; in the *immature* the outer extremity of pectoral, lobe of caudal, and the tips of the fins dark black; ventral and anal white-edged. [illegible]dvances, the second dorsal becomes black-tipped and the [illegible] a darker edge.

Hab. This shark is very common along the sea-coasts of India, and appears to frequent the tropical parts of the Atlantic, and of the Pacific coast of Central America, and to extend throughout the Indian Ocean. It attains at least six feet in length.

17. (17.) **Carcharias temminckii.**

Carcharias (Prionodon) temminckii, *Müll. & Henle, Plagios.* p. 48, t. xviii.

Carcharias temminckii, *Day, Fish. India*, p. 717 (see synon.).

Length of the preoral portion of the snout about four fifths the width of the mouth. Nostrils nearer to the mouth than to the end of the snout. *Teeth* $\frac{36-38}{38-40}$, upper rather narrow with a broad base, erect and serrated; the lower erect, entire, awl-shaped; the teeth near the outer angle of the jaws very small. *Fins*—first dorsal inserted midway between the roots of the pectoral and ventral fins;

pectoral with its upper edge nearly three times the width of the lower. Second dorsal opposite anal, and nearly as large as the first. *Colour*—uniform.

Hab. Seas of India.

2. Genus **HEMIGALEUS**, Bleeker.

Syn. *Chænogaleus*, Gill.

Spiracles minute and behind the eye. Nictitating membrane present. A pit before the root of the caudal fin both above and below. Snout longitudinally produced. Mouth crescentic, with labial folds. Teeth in the upper jaw denticulated, not so in the lower. The first dorsal fin, which is destitute of a spine, is placed opposite the interspace between the pectoral and ventral; caudal with a single notch.

These fishes have been divided from *Carcharias* on account of the existence of a rudimentary spiracle behind the eye, and likewise because the labial folds, which are rare in *Carcharias*, are developed in all known species of the present genus.

Geographical Distribution. Coromandel coast of India to the Malay Archipelago.

18. (1.) **Hemigaleus balfouri.** (Fig. 2.)

Hemigaleus balfouri, *Day, Fish. India*, p. 717, pl. clxxxv, fig. 4.

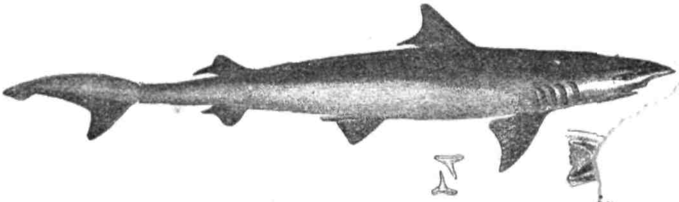

Fig. 2.—*Hemigaleus balfouri.*

Length of the preoral portion of the snout slightly e the width of the mouth, and not quite equalling the between the eye and the first gill-opening. Spiracle minu ated about one half the diameter of the eye posterior to t A groove at the angle of the mouth extending some distan each jaw. Nostrils situated nearer to the mouth than to of the snout. The distance between the outer angles nostrils equal to the width of the mouth. Gill-openings a twice the width of the orbit. *Teeth* $\frac{24}{24}$, those in the uppe smooth, notched externally, or with about three denticulat along the outer side of the base; those in the lower jaw o slightly smaller size, erect and smooth. *Fins*—pectoral falcifor extending to below the first third of the base of the dorsal fin, tl

inner nearly equalling one third of the outer margin. First dorsal (with about 24 rays) having its base almost midway between the end of the base of the pectoral and the origin of the ventral fins. Second dorsal (with about fifteen rays) commencing slightly in advance of the anal; the length of its base equal to rather above one half of that of the first dorsal, while it is a little larger than the anal. Caudal fin equal to about $\frac{1}{5}$ of the total length. *Colour*—dark brown; fins grey, the second dorsal with a dark summit.

Hab. Coromandel coast of India.

3. Genus **GALEOCERDO**, Müller & Henle.

Spiracles small. Nictitating membrane present. Mouth crescentic. Teeth large, flat, triangular, and oblique, serrated on both edges, and with a deep notch on the outer margin. The first dorsal spineless, placed opposite the interspace between the pectoral and ventral fins; caudal with a double notch. A pit on the tail both above and below, at the base of the caudal fin.

Sharks of this genus are much dreaded in India, the native fishermen distinguishing those forms with long conical teeth from others having elongated or triangular cusps with serrated edges. The former can be captured by lines and even by nets; but the latter immediately cut through nets and sever lines, rendering it necessary to attach the hooks to chains. Sharks seem to prefer their food a little high, and therefore the natives bury the bait in the ground for a day or more before using it. It was apparently a fish belonging to this genus which was referred to in the Transactions of the Royal Society of Arts and Sciences of Mauritius, vii. 1873. Col. Pike observed of the specimen the . it was 13 feet 9 inches long, and had "a terrible incident ...noted with it. The men of M.M. steamer 'Emirne' caught it, ... was exposed for sale in the bazar. When cut open, a clasp ...and belt, with the bone of a man's arm, were found in it. ...f course, gave rise to the most horrible surmises, especially ...as rumoured that a few days previously a sailor had deserted ... vessel in the harbour, and was supposed to have been ...d by a shark before he could reach the shore" (p. 27).

...raphical Distribution. Seas of the Tropics, also of tempe-... Arctic regions.

Synopsis of Indian Species.

...al fin $3\frac{1}{2}$ to 4 in the total length. Teeth ...lenticulated, and of equal size in both jaws. 1. *G. rayneri*, p. 20.

...al fin 3 to $3\frac{1}{4}$ in the total length. Teeth denticulated, and rather smaller in the lower than in the upper jaw .... 2. *G. tigrinus*, p. 21.

19. (1.) **Galeocerdo rayneri.** (Fig. 3.)

Galeocerdo rayneri, *McDonald & Barron, P. Z. S.* 1868, p. 368, pl. xxxii.; *Day, Fish. India*, p. 718, pl. clxxxvii, fig. 3 (see synon.).

Wulluven sorrah, Tam.; *Kettalum sorrah*, Tel.

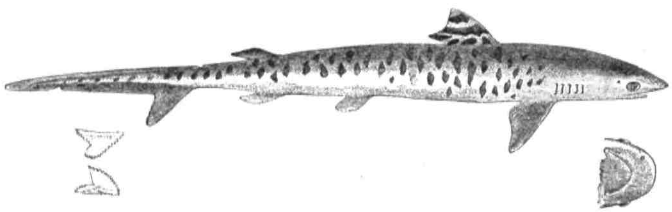

Fig. 3.—*Galeocerdo rayneri.*

Length of preoral portion of the snout much less than the width of the mouth. A groove at the angle of the mouth extending some distance along the side of the maxilla; nostrils nearer the end of the snout than the mouth. Gill-openings not so wide as the orbit. *Eyes*—rather large. *Teeth* $\frac{23}{23}$, large, of equal size in both jaws, compressed and serrated in their whole extent in both jaws, as well as notched externally above the base. *Fins*—pectoral falciform, extending to beneath the anterior third of the first dorsal. Origin of first dorsal a short distance behind the base of the pectoral, but nearer to that fin than to the ventral, which latter is midway between the hind edge of the first dorsal and the origin of the anal. Second dorsal above the anal, the two being of about equal size. Length of the caudal $3\frac{1}{2}$ to 4 in the total length apparently decreasing in comparative length with age. *Colo*- dark grey superiorly, becoming dull white beneath; chee lower surface of the snout yellowish. Body, from a short d behind the gill-openings, with numerous large black spo vertical bars. Fins grey, the first dorsal with irregular bands.

This fish, probably a variety of *G. arcticus*, attains to a co able size in the Indian seas, where it is not numerous. being exceedingly fierce, Jerdon has remarked that it cunning and swells itself out so as to appear like a floating animal substance, and having thus decoyed its prey it imm attacks it. It eats everything, even sea-snakes. Sir W. observed that he obtained an example of this voracious shark 4 in. long; in its stomach were the remains of fish of variou and several shin-bones of beef partially digested. Anoth ample, $8\frac{1}{4}$ feet long, had the remains of a sea-snake (*Hyd nigrocincta*) and of a siluroid fish.

Hab. Indian and Australian Seas; attaining upwards of 1 feet in length.

20. (2.) **Galeocerdo tigrinus.**

Galeocerdo tigrinus, *Müll. & Henle, Plagios.* p. 59, t. xxiii; *Day, Fish. India*, p. 718 (see synon.).

Length of the preoral portion of the snout equal to one half the width of the mouth and slightly less than the distance between the inner angles of the nostrils. A long labial fold along the edge of the upper jaw. *Teeth*—in lower jaw not so large as those in the upper, denticulated in both jaws, and the denticulations at the base of each cusp also serrated, more especially in the lower jaw. *Fins*—the first dorsal commences above the angle of the pectoral; second dorsal arises slightly in advance of the anal. Length of caudal contained 3 to $3\frac{1}{4}$ times in the total length, and considerably (one third) exceeding the length of the interspace between the two dorsal fins. *Colour*—grey superiorly, becoming slightly lighter on the sides and beneath; numerous brown or dark grey spots over the body.

Hab. Red Sea, seas of India to Japan, and beyond.

Second group. ZYGÆNINA.

4. Genus **ZYGÆNA**, Cuvier.

Syn. *Cestracion*, Klein; *Cestrorhinus*, Blainv.; *Sphyrna* (Raf.), Müll. & Henle; *Eusphyrna* and *Reniceps*, Gill.

Combun sorrah, Tam.

The anterior portion of the head is broad, flattened, and laterally elongated, with the eyes situated at its lateral extremities and the nostrils at its fore border. A nictitating membrane present. Spiracles absent. Mouth crescentic. Teeth similar in both jaws, oblique and notched. The first dorsal fin spineless, situated above the interspace between the pectoral and the ventral; caudal with [illegible] notch, and a pit at the commencement of the fin.

[illegible]s genus of sharks is reputed to be very dangerous in some [illegible]ies. The young are captured along the shores of India and [illegible] in large numbers.

Synopsis of Indian Species.

[illegible]oove along front edge of head.

[illegible]lateral expansion of the side of the [illegible] two or three times as long as broad 1. *Z. blochii*, p. 22.

[illegible]length of the hind edge of each [illegible]al expansion of the head nearly or [illegible]te equal to its width near the eye.... 2. *Z. malleus*, p. 22.

[illegible]rior edge of head curved but not [illegible]ontinuous with the lateral one; the [illegible]ength of the hind edge of each lateral expansion is less than its width near the eyes 3. *Z. tudes*, p. 23.

No groove along front edge of head.

Anterior edge of head nearly straight; length of hind edge of lateral expansion exceeds width .... 4. *Z. mokarran*, p. 23.

21. (1.) Zygæna blochii. (Fig. 4.)

Zygæna blochii, *Cuvier, Règne Anim.* ii, p. 127; *Val. Mém. Mus.* ix, p. 227, pl. i, f. 2; *Day, Fish. India*, p. 719, pl. clxxxiv, fig. 4 (see synon.).

Koman sorrah, Tam.; *Sappa sorrah*, Tel.; *Nga man kuéy*, Burmese.

Each lateral expansion of the side of the head from twice to thrice as long as broad, and with a deep groove along the anterior edge, reaching externally nearly as far as the orbit. The posterior edge of the lateral expansion about as long as its anterior edge, while the external edge is nearly straight. Nostril much nearer the mouth than the eye. *Eyes*—situated near the upper angle of the

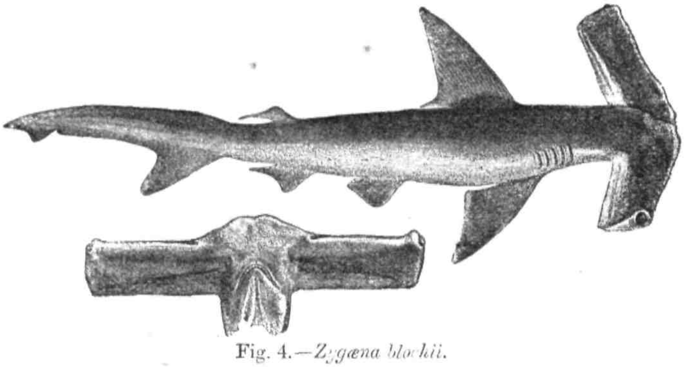

Fig. 4.—*Zygæna blochii.*

external edge of the lobe of the head. *Teeth*—oblique, externally notched and smooth in their entire extent. *Fins*—the dorsal arises slightly behind the base of the pectoral, extending nearly halfway to above the ventral; second dorsal arising above the posterior half of the anal, than which it is much smaller. *Colour*—of a deep grey or brownish-grey, becoming lighter beneath; fins are usually of a slightly deeper colour than the body.

Hab. Seas of India to the Malay Archipelago, and b Blyth observed that it rarely exceeded 4 feet in length. T the commonest form on the Malabar coast, where the fisl consider it attains to a very large size.

22. (2.) Zygæna malleus.

Squalus zygæna, *Linn. Syst. Nat.* p. 399.
Zygæna malleus, *Shaw, Nat. Misc.* viii, pl. 267; *Day, Fis* p. 719, pl. clxxxvi, fig. 4 (see synon.).

Nga man thanwoot, Burmese.

The hind edge of the lateral expansion of the head nearly its width near the eye, and has a groove along almost its e anterior margin. Nostrils close to the eye. *Colour*—body fins slaty-grey; under surface white. In a female taken at Pina Canton observed 37 living young, of which 20 were males and females.

Hab. Tropical and temperate seas.

23. (3.) Zygæna tudes.

Zygæna tudes, *Val. Mém. Mus.* ix, p. 225, pl. ii, f. 1; *Day, Fish. India*, p. 720, pl. clxxxviii, fig. 4 (see synon.).

Koma sorrah, Tel.

Anterior edge of head curved, but the front margin is not continuous with the lateral; the length of the hind margin less than the width near the eye. *Eyes*—situated just below the junction of the anterior and outer edges of the snout. Nostril close to the eye. A groove running along the anterior edge of the head. *Teeth*—oblique, with a notched outer edge. *Fins*—dorsal arises above the hind margin of the inner edge of the pectoral fin, its height equals the length of the pectoral; second dorsal over the hind half of the anal; length of the base of the anal extends $\frac{2}{3}$ of the distance to the ventral; caudal 3 to $3\frac{1}{3}$ in the total length. *Colour*—grey, becoming lighter beneath; first dorsal fin very dark, the upper portion of the second dorsal and the lower caudal lobe deep black in newly captured examples, the colour fading after they have been some time in spirit. One example, captured at Cochin, Dec. 27, 1872, besides the black marks on the fins mentioned, had the hind edge of the dorsal and the end of the pectorals dark.

Hab. Mediterranean, Indian Ocean and Archipelago, also tropical parts of the Atlantic. It attains several feet in length.

24. (4.) Zygæna mokarran.

Zygæna mokarran, *Rüppell, N.W. Fische*, p. 66, t. xvii, f. 3; *Day, Fish. India, Supplement*, p. 809 (see synon.).

Anterior edge of head nearly straight, forming a more or less right angle with the lateral margin. Length of hind edge of one of the lobes equal to its width near the eye; no groove running along the anterior edge of the head. *Eyes*—near nostrils. *Teeth*—[illegible], as broad at their base as long, with an indistinct lateral [illegible] and serrated on both edges. *Colour*—brownish-grey, becoming white beneath.

Hab. Red Sea to Kurrachee.

Third group. MUSTELINA.

5. Genus **MUSTELUS**, Cuvier.

Nictitating membrane present. Small spiracles behind the eyes. Mouth crescentic, with long labial folds. Teeth small, numerous, similar in both jaws, and pavement-like, obtuse, or with indistinct cusps. The first dorsal fin spineless, situated above the interspace between the pectoral and ventral; the second nearly as large as

the first; caudal without a distinct lower lobe, and no pit at the ommencement of the fin.

Geographical Distribution. Seas of tropical and temperate regions*.

25. (1.) **Mustelus manazo.** (Fig. 5.)

Mustelus manazo, *Bleeker, Batav. Gen. Verhand.* xxvi, *Ichth. Japan,* p. 126; *Day, Fish. India,* p. 720, pl. clxxxvi, fig. 3 (see synon.).

Pah sorrah, Tel.

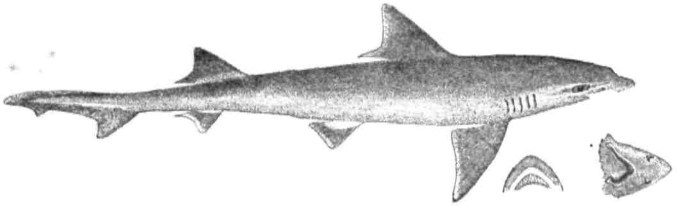

Fig. 5.—*Mustelus manazo.*

Snout produced and pointed, the length of its preoral portion equalling the width of the mouth (or $\frac{1}{4}$ more in the fœtus), which latter is somewhat angular. A well-developed labial fold at each angle of the mouth. *Teeth*—rhombic, and destitute of any distinct cusps. *Fins*—the first dorsal arises opposite the posterior end of the base of the pectoral, and does not extend to above the anal; the second dorsal smaller than the first, but the length of the bases of the two about the same. Pectoral reaches to below centre of first dorsal; anal commences beneath the posterior half of the second dorsal and is smaller than it. Caudal $\frac{2}{9}$ of the total length, its lower lobe moderately developed and notched. *Colour*—red grey superiorly, becoming dull white beneath. Posterior ext of the caudal of a dark colour.

Hab. Seas of India to Japan. I obtained at Kurrachee (16·5 inches in length) which had several young inside.

6. Genus **TRIÆNODON**, Müller & Henle.

No spiracles. Nictitating membrane present. Mouth with a pit behind its angle. Teeth numerous in both ja consisting of one central cusp and a smaller lateral one on e First dorsal spineless, placed opposite the interspace betw pectoral and ventral fins. Lower caudal lobe distinct. A pit root of the caudal fin.

* *Mustelus vulgaris* and *M. lævis* have both been captured in the Red Se

26. **(1.) Triænodon obtusus***. (Fig. 6.)

Triænodon obtusus, *Day, Fish. India*, p. 720, pl. clxxxix, fig. 3.

Snout short and rounded, the distance between the mouth and the end of the snout about half the width of the mouth. Nostrils nearer end of snout than the mouth, each with a flap. Eye of moderate size. Gill-openings rather wider than the orbit. No spiracle. *Teeth*—with one central and a small lateral cusp on each side. *Fins*—the first dorsal commences behind the inner angle of

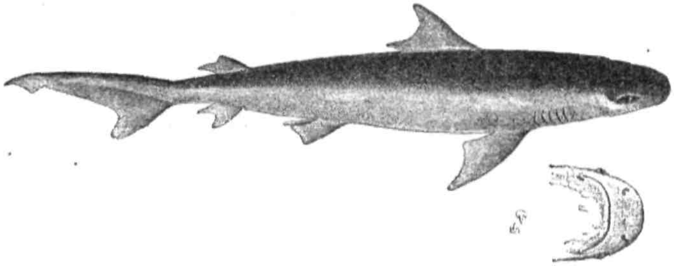

Fig. 6.—*Triænodon obtusus.*

the pectoral and the base does not extend to above the ventral. Second dorsal not quite half as large as the first and situated above the anal. Pectoral reaches to below the middle of the first dorsal; caudal fin nearly $\frac{1}{4}$ of the total length. *Colour*—dark above, becoming lighter beneath.

Hab. A young male, nineteen inches in length, was obtained at Kurrachee.

Family II. LAMNIDÆ.

a, Marati ...racles, if present, minute. No nictitating membrane. Mouth
...r and crescentic. Nostrils not communicating with the
d as bro... First dorsal spineless, and placed opposite the interspace
it. Un...n the pectoral and ventral fins; an anal fin present.

Synopsis of Indian Genera.

...ng the side of the tail .... 1. LAMNA.
...ong the side of the tail. Caudal fin less than
...hird total length .... 2. ODONTASPIS.
. Caudal fin nearly one half total length .... 3. ALOPIAS.

---

* *Triænodon obesus* (*Carcharias*), Rüppell, N.W. Fische, p. 64, pl. xviii, f. 2.—...ut very short and obtuse. Nostrils with a short tentacle. *Fins*—first dorsal ...se to the root of the ventral; the second upwards of half the size of the first and ...osite the anal. Summits of dorsal and caudal fins white. *Hab.* Red Sea; ...t coast of Africa; New Hebrides; and probably off India.

1. Genus LAMNA, Cuvier.

Syn. *Oxyrhina*, Agassiz.

Spiracles, if present, minute. No nictitating membrane. Mouth wide. Gill-openings large. Teeth large, awl-shaped, smooth or sometimes with a small lateral basal cusp on either side. The first dorsal fin spineless, placed opposite the interspace between the bases of the pectoral and ventral fins. Lower caudal lobe large. A keel along the side of the tail. A pit at the base of the caudal fin *.

27. (1.) Lamna spallanzanii. (Fig. 7.)

Oxyrrhina spallanzanii, *Bonap. Faun. Ital., Pesc.* t. cxxxvi, fig. 1.
Lamna spallanzanii, *Day, Fish. India*, p. 722, pl. clxxxvi, fig. 2 (see synon.).

Ganumu sorrah, Tam.

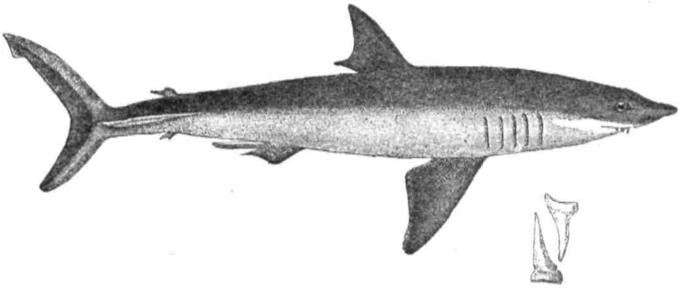

Fig. 7.—*Lamna spallanzanii.*

Snout pointed, angle of the mouth about midway between the nostril and the first gill-opening. Gill-openings very wide. *Te*
$\frac{13}{13}$ on each side, awl-shaped, with sharp but entire lateral
and destitute of basal cusps; the third on each side of th
physis of the upper jaw smaller than those on either sid
Fins—the base of the first dorsal rather nearer the pecto
the ventral fin. Pectoral falciform, its inner being one f
the length of its outer margin. Second dorsal and an
situated opposite one another; the keel on the side of
commences in front of the bases of these fins. *Colo*
becoming lighter beneath.

Lamna güntheri, Murray (Ann. & Mag. Nat. Hist (5) xiii.
obtained at Kurrachee, is said to differ, having $\frac{22}{28}$ teeth o

* In a specimen of this genus, *Lamna cornubica*, Pennant, in Wales, o
two embryos, and Neill, in 1804, remarked of one six feet long, at New
that "no fewer than thirty young ones appeared, fifteen in each of two ba
These were all from 12 to 14 inches in length, fully formed, and apparent
ready for exclusion."

side, and the dorsal being a little further behind the base of the pectoral fin.

Hab. Red Sea and Indian Ocean, also the Atlantic and Mediterranean. This species attains to a very large size.

2. Genus **ODONTASPIS**, Agassiz.

Syn. *Triglochis,* Müller & Henle.

Spiracles minute and above the angle of the mouth. No nictitating membrane. Mouth wide and crescent-shaped. Teeth large, awl-shaped, and with one or two cusps at the base. Gill-openings of moderate size. Two spineless dorsal fins, the first opposite the interspace between the pectoral and ventral; the second dorsal and the anal not much smaller than the first dorsal. A pit present or absent at the root of the caudal fin.

Geographical Distribution. Temperate and tropical seas.

28. (1.) **Odontaspis tricuspidatus.** (Fig. 8.)

Carcharias tricuspidatus, *Day, Fish. India,* p. 713, pl. clxxxvi, fig. 1.

Dundanee, Sind.

Length of preoral portion of the snout equal to half the width of the mouth, and not equal to half the distance between the eye and the first gill-opening; no groove at the angle of the mouth.

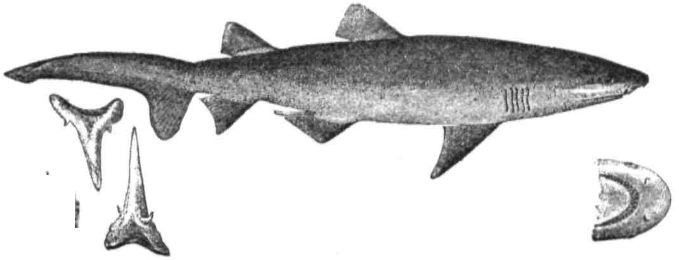

Fig. 8.—*Odontaspis tricuspidatus.*

arer to the mouth than to the end of the snout. Gill-
uch wider than the orbit. *Teeth*—$\frac{32-34}{30-34}$, very large, awl-
ooth except at the base, where there exists a small basal
her side. The fourth tooth on each side of the sym-
he upper jaw very much smaller than those next to it;
...... tooth on each side of the symphysis of the mandibles
er; the last few lateral rows in both jaws small. *Fins*—
ral reaching to below the base of the first dorsal; the inner
one fifth of the length of the outer. First dorsal very slightly
· than the second, its base situated nearer to the ventral than
the pectoral. The second dorsal slightly in advance of and

about the same size as the anal; length of base of anal equal to its distance from the ventral. Caudal fin $3\frac{1}{2}$ in the total length. *Colour*—brown superiorly, becoming dull white beneath.

Hab. Seas of Sind, where they abound—attaining at least twenty feet; one on board a native craft measured that length. A specimen, $10\frac{1}{2}$ feet long, from South Australia, is in the British Museum; also several jaws.

3. Genus **ALOPIAS**, Rafinesque.

Mouth crescentic. No nictitating membrane to the eye. Spiracles minute, close behind the orbit. Teeth of rather small size, flattened and triangular, having smooth edges. Gill-openings of medium size. The first dorsal fin spineless, inserted above the interspace between the pectoral and ventral fins; the second dorsal above the interspace between the ventral and anal, the latter being very small; caudal very long, with a pit at its commencement. No keel on the side of the tail.

29. (1.) **Alopias vulpes.** (Fig. 9.)

Squalus vulpes, *Gmel. Syst. Nat.* p. 1496.
Alopias vulpes, *Day, Fish. India, Supplement*, 1888, p. 810 (see synon.).

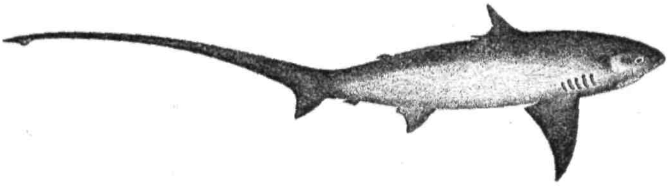

Fig. 9.—*Alopias vulpes.*

Body fusiform, gradually decreasing in size to the cau
the great length of which is about half the total. *Eyes*—
large. Nostrils beneath and nearer the anterior border
mouth than the end of the snout. Gill-openings of med
the two last being over the pectoral fin. *Teeth*—about
third or fourth tooth on either side of the centre of the
being smaller than the others.

Hab. Both shores of the Atlantic Ocean, and the Medit
One example from the Cape is in the Paris Museum.
('Taprobanian,' 1886, i. p. 167) recorded one 8 feet 8 inch
from Ceylon; it was procured in the Colombo market in Feb.
where it was quite unknown to the fishermen. It has also
obtained from San Francisco Bay, California, and New Zeala

Family III. RHINODONTIDÆ.

Spiracles minute. No nictitating membrane. Gill-openings wide. Two spineless dorsal fins, the origin of the first opposite to the ventral or somewhat in advance of it; the second small, placed nearly opposite the anal; lower caudal lobe well developed. A keel along the side of the tail. A pit at the root of the caudal fin.

1. Genus RHINODON, Smith.

Definition as in family. Mouth and nostrils near the extremity of the snout. Teeth small and conical. Gill-rakers similar to those of the Basking Shark of northern seas.

Geographical Distribution. Ceylon, Seychelles to the Cape of Good Hope. This shark has been said to exceed fifty feet in length, and some authors even assert seventy. It is a harmless form.

30. (1.) **Rhinodon typicus.**

Rhinodon typicus, *Smith, Illust. Zool. South Africa, Pisces,* pl. xxvi; *Day, Fish. India, Supplement,* p. 811 (see synon.)

Snout broad, flat and short. Eyes small. Upper jaw with a long labial fold. *Colour*—brown, with white dots and narrow transverse lines.

Hab. One example recorded by Haly from the west coast of Ceylon.

Family IV. NOTIDANIDÆ.

Spiracles small and on the side of the neck. No nictitating ...ne. Gill-openings six or seven. A single spineless dorsal ...d nearly opposite to the anal; lower caudal lobe present. ...t the root of the caudal fin.

1. Genus **NOTIDANUS**, Cuvier.

...anchus and *Heptanchus*, Rafin.; *Monopterhinus*, pt., Blainv.

... small and on the side of the neck. No nictitating ... Mouth crescentic. No labial fold. Gill-openings ...n, and wide. Teeth in the upper jaw consisting of one ... pairs that are awl-shaped, followed by six broader ones, ...ave one strong and several smaller cusps. In the lower ... large comb-like teeth on each side, and some smaller lateral ... A single, spineless dorsal fin placed opposite the anal; ...udal lobe present. No pit at the root of the caudal fin.

Geographical Distribution. Seas of tropical and temperate regions.

31. (1.) **Notidanus indicus.** (Fig. 10.)

Notidanus indicus, *Agassiz, Poiss. Foss.* iii, pp. 92, 217, t. E, f. 1 (teeth); *Day, Fish. India*, p. 723, pl. clxxxix, fig. 4 (see synon.).

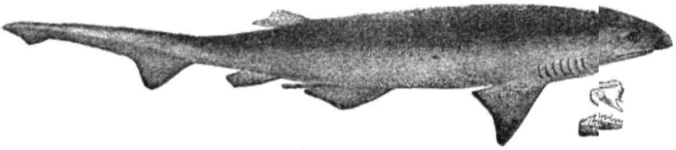

Fig. 10.—*Notidanus indicus.*

Snout rounded and obtuse. Cleft of mouth wider than deep. *Teeth*—opposite the symphysis of the upper jaw is a tooth having a single cusp, those on either side being stronger and denticulated. The central tooth in the lower jaw has no median cusp, but two or three lateral cusps on each side. *Colour*—grey, with dark plotches and marks.

Hab. Seas of India and South Africa to California.

Family V. SCYLLIIDÆ.

Spiracles present. Eye without any nictitating membrane. Mouth inferior. Teeth small, several rows being generally in use. The first dorsal fin spineless, placed above or behind the ventrals; an anal present, which may be in front of, below, or behind the second dorsal.

Synopsis of Indian Genera.

A. Nasal and buccal cavities separate; upper edge of caudal fin smooth .... 1. Scyllium.
B. Nasal and buccal cavities confluent.
  Minute spiracle behind each eye; second dorsal fin nearly opposite anal ...... 2. Ginglymost
  Spiracle behind eye and equal to it in size. Caudal portion of body and fin very long .... 3. Stegostoma.
  Spiracle below eye and well developed; anal fin behind second dorasl........ 4. Chiloscyll

1. Genus **SCYLLIUM**, Cuvier.

Syn. *Scylliorhinus, Halælurus, Poroderma*, and *Cephaloscylli*

Spiracles behind the eye. Nasal and buccal cavities c Teeth small, in several rows; usually with a central and two lateral cusps. Origin of anal fin in advance of that second dorsal; upper edge of caudal not serrated.

These sharks, or "dog fishes," do not attain to any large but are much dreaded by fishermen, as they get entangled in

nets, from which great injury occurs. The eggs are somewhat similar to those of the rays. The skins form fine shagreen.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Species.

Nasal valves confluent, with a single transverse uninterrupted flap and a well-developed labial fold	1. *S. marmoratum*, p. 31.
Nasal valves separated from one another by a considerable interspace	2. *S. capense*, p. 31.

32. (1.) Scyllium marmoratum. (Fig. 11.)

Scyllium marmoratum, *Bennett, Life of Sir S. Raffles*, p. 693; *Day, Fish. India*, p. 724, pl. cxc, fig. 2 (see synon.).

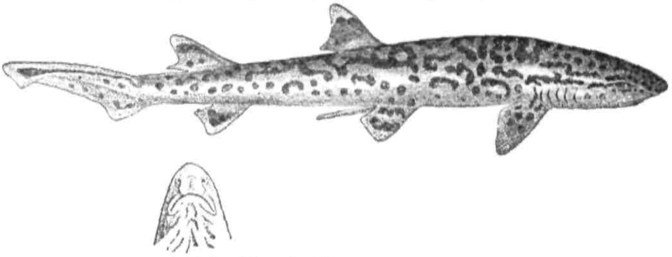

Fig. 11.—*Scyllium marmoratum.*

Length of the snout equals the width of the mouth. Nasal valves confluent in the form of a single broad flap, with a free posterior edge, and no cirrus. A well-developed labial fold. Gill-openings as wide as the orbit. *Teeth*—small. *Fins*—the first dorsal commences just behind the ventral; the second dorsal slightly larger than the first, and has the anal beneath its anterior one half or two thirds. *Colour*—of a tawny brown, becoming lighter beneath. Lines of spots, some of which occasionally become con-

Tonã ...t, exist along the body; there may also be bands or ocelli.

ung), Tel. ...eas of India, where it is rare, to the Malay Archipelago.

linvála, Marath.

Head as br

hind it. U

33. (2.) Scyllium capense.

...apense (*Smith*), *Müller & Henle, Plagios.* p. 11; *Day, ...lia*, p. 724, pl. cxc, fig. 1 (see synon.).

...e. Nasal valves distinct, separated from one another ...ble interspace, and having no prominent cirrus. No ...the upper jaw, but a short one on the lower. Gill- ...ow, not so wide as the orbit. *Teeth*—minute. *Fins* ...rst dorsal is inserted rather nearer to the anal than to the the ventral; the second dorsal situated entirely behind the *Colour*—brown, lightest beneath. Body with light vertical ...nd some white blotches.

b. An Indian example, about 40 inches in length, is in the ...ritish Museum.

nout

2. Genus **GINGLYMOSTOMA**, Müller & Henle.

Syn. *Nebrius*, Rüppell.

A minute spiracle behind the eye, which also is minute. A quadrangular flap formed before the mouth by the conjoined nasal valves, and which has a free cirrus on either side. A superior and an inferior lip, the latter not extending across the symphysis. Nasal and buccal cavities confluent. Teeth either in many rows with a strong median and one or two smaller lateral cusps; or else in merely about three rows, of which the foremost only is in use, and each tooth with a convex and serrated edge. Fourth and fifth gill-openings situated close together. Dorsal fins spineless, the first above or behind the ventrals, the second rather in advance of or opposite to the anal.

Geographical Distribution. Red Sea, Indian Ocean to the Malay Archipelago; also tropical parts of the Atlantic.

Synopsis of Indian Species.

Teeth in three rows, with one central and four or five lateral cusps; second dorsal fin larger than the anal .... 1. *G. concolor*, p. 32.

Teeth in many rows, with one central and three or four lateral cusps; second dorsal fin smaller than the anal .... 2. *G. mülleri*, p. 33.

34. (1.) **Ginglymostoma concolor.** (Fig. 12.)

Nebrius concolor, *Rüppell, N.W. Fische*, p. 62, t. xvii, f. 2.
Ginglymostoma concolor, *Day, Fish. India, Supplement*, p. 811 (see synon.).

Snout short. The nasal cirrus nearly reaches the lower lip. *Teeth*—in three rows, with one central and four or five lateral cusps, having serrated edges. *Fins*—angles of dorsal and of all paired

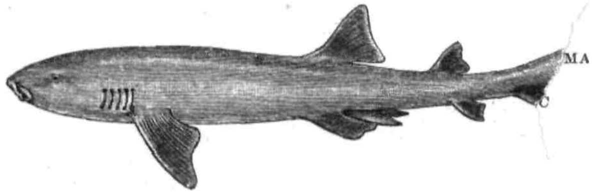

Fig. 12.—*Ginglymostoma concolor.*

fins pointed; second dorsal much smaller than the fir than the anal, and placed nearly opposite to the la one third of the total length.

Hab. Red Sea, and through the seas of India to the I Archipelago.

35. (2.) Ginglymostoma mülleri.

Ginglymostoma mülleri, *Günther, Catal.* viii, p. 408; *Day, Fish. India*, p. 725 (see synon.).

Snout very short, its length not equalling the width of the mouth. Nasal cirrus short, reaching to the edge of the upper lip. *Teeth*—in many rows, each with a large central cusp, and three or four lateral cusps on each side. *Fins*—first dorsal opposite the ventral, angles of all the paired fins pointed; second dorsal slightly in advance of the anal, but rather smaller than it or than the first dorsal. Caudal nearly one third of the total length.

Hab. Red Sea and Indian Ocean. Said to attain $8\frac{1}{2}$ feet in length.

3. Genus **STEGOSTOMA**, Müller & Henle.

Spiracles about the size of the small eyes, behind which they are situated. Fourth and fifth gill-openings close together. Nasal and buccal cavities confluent. Snout obtuse; upper lip thick, with a cirrus on either side. A well-developed labial fold round the angle of the mouth. Teeth small, sometimes trilobed, the dental plate being almost quadrangular. Two spineless dorsal fins, the first above the ventral, the second anterior to the anal, which is near the caudal, the latter being very elongate.

Geographical Distribution. From the Red Sea and east coast of Africa, through the seas of India to the Malay Archipelago, and Formosa.

36. (1.) Stegostoma tigrinum. (Fig. 13.)

Squalus tigrinus, *Gmel. Syst. Nat.* p. 1493.
Stegostoma tigrinum, *Day, Fish. India*, p. 725, pl. clxxxvii, fig. 4 (young) (see synon.).

Pollee-makum, Kongarasi and *Oorookoolti sorrah*, also *Potrava* (when young), Tel.; *Corungun sorrah*, "monkey-mouthed shark," Tam.; *Shinvála*, Maráthi.

Head as broad as long. *Eye*—small, with the spiracle just behind it. Upper lip very thick, like a quadrangular pad, with a

Fig. 13.—*Stegostoma tigrinum.*

barbel on either side. A distinct labial fold round the angle of the mouth, which is slightly nearer to the eye than to the end of the snout. *Teeth*—small and trilobed. *Fins*—the origin of the first dorsal is a little posterior to the base of the ventral, it is about

as high in front as its base is long, and larger than the second dorsal, which commences a short distance behind it and anterior to the anal. Caudal fin very long, being about one half of the total length and with a notch below near its extremity. A low median, tubercular dorsal ridge, and sometimes a second on either side of dorsal fin. *Colour*—(*young*) white or buff, in the form of markings, the fish appearing black, with narrow white lines or bands, between which are white spots, across the head and body; these markings take on various forms in different examples. Adults tawny, or with more or less transverse bands of rounded spots, the colour of the fish being brownish.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago, and beyond; attaining to 10 or 15 feet in length. This species is common at Madras. Its favourite food consists of mollusks and crustacea.

4. Genus **CHILOSCYLLIUM**, Müller & Henle.

Syn. *Hemiscyllium*, Müll. & Henle.

Spiracle below the eye. Fourth and fifth gill-openings close together. Nasal and buccal cavities confluent; nasal valve with a barbel. Lower lip continuous or interrupted in the centre. Teeth small, triangular, with or without lateral cusps. Two spineless dorsal fins, the first above or behind the ventrals, the second considerably anterior to the anal, which is near the caudal.

Geographical Distribution. Seas of India to the Malay Archipelago, and Australia.

37. (1.) **Chiloscyllium indicum.** (Fig. 14.)

Squalus indicus, *Gmel. Syst. Nat.* p. 1503.
Chiloscyllium indicum, *Day, Fish. India*, p. 726, pl. clxxxviii, fig. 3 (see synon.).

Bokee-sorrah or *Ra-sorrah*, Tel.; *Corungun sorrah*, Tam.; *Ettee*, Mal.; *Poos-hee*, Belooch.; *Bálavála*, Maráthi; *Nga man ingmyoung*, Burmese.

Head rather depressed and flatter below than above. *Eye*—small, with the spiracle (which is of about the same size) below and slightly posterior to it. Lips surround the mouth, the lower

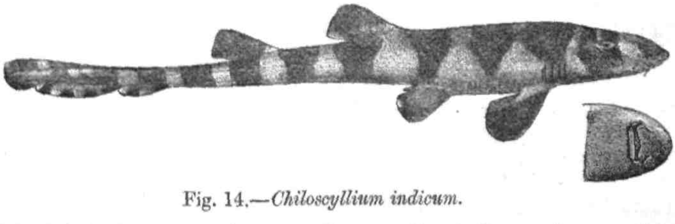

Fig. 14.—*Chiloscyllium indicum.*

labial fold being continuous; the mouth at its angle one third nearer to the eye than to the end of the snout, which is obtuse. Nasal valve with an elongated barbel. *Teeth*—small, triangular

with lateral cusps. *Fins*—the origin of the first dorsa is just posterior to the base of the ventral, the anterior edge of the former exceeds the length of its base, which latter distance equals the length between the two dorsal fins, both of which have their anterior and upper edges rounded; the second fin somewhat smaller than the first and ending some distance anterior to the origin of the anal. Anal notched, terminating close to the caudal fin, which is also notched posteriorly, and is contained about $5\frac{1}{2}$ times in the total length. From one to three smooth or tubercular ridges may exist along the back, or may be entirely absent. *Colour*—this varies exceedingly: usually grey with dark, or even black, cross-bands, which may or may not include white spots; sometimes the cross-bands break up into spots or bands, having dark edges; or the fish is simply of a reddish-brown colour.

Hab. Seas of India to the Malay Archipelago, and beyond.

Suborder B. *BATOIDEI.*

Spiracles present; gill-openings in five pairs, and on the ventral surface of the body. Body depressed, forming, with its largely developed pectoral fins, a more or less flat disk, and usually having a thin and slender tail. Dorsal fin, when present, in the caudal portion of the body; anal absent.

Some of these fishes approach the sharks in external form, the tail portion not being so sharply contracted behind the trunk as in most rays.

Skates and rays exist in enormous numbers in the Indian seas, where they attain to a great size, and some are dreaded by fishermen because of the wounds inflicted by their caudal spines, while others cause great injury to the oysters and other mollusks. Skates are gregarious, and may suddenly arrive, to the dismay of the owner of an oyster-bed, as they appear to remain so long as any mollusks are to be obtained. Rays lie concealed in the sand, and are reputed to be able to suddenly encircle fish or prey swimming above them with their long whip-like tails, and then wound them with their serrated tail-spines. They are observed in aquaria to cover their victims with their expanded body and subsequently convey their prey to their mouths by movements of their pectoral fins. Their skins were formerly valuable as shagreen, being considered superior to those of sharks. Irrespective of this use, they are occasionally employed as rasps or sand-paper, to give the first surface to wood or horn which it is desired to polish. Their fins are exported, along with those of the sharks, to China, where they are in request for soups, while from their livers an oil is extracted (see pp. 5, 6, *ante*).

The thin horny cases, inside which are the fœtal rays, are more quadrangular in form and comparatively smaller than what are observed among the sharks; such cases have a horn-like projection from each corner.

Synopsis of Indian Families.

I. A flattened snout, having lateral teeth, rendering it saw-like. Trunk passing gradually into the tail	**Pristidæ.**
II. Pectoral fins not continued to the snout. Trunk gradually passing into the tail, which has two dorsals and a caudal fin....	**Rhinobatidæ.**
III. Trunk a broad smooth disk. Usually dorsal and caudal fins. An electric organ	**Torpedinidæ.**
IV. Trunk a broad and generally a rough disk. Pectoral fins extend on to the snout. A fold along each side of the tail; no serrated caudal spine. No electric organ..........	**Raiidæ.**
V. Pectoral fins extend on to and are confluent at the snout. No fold along side of tail, which latter is usually armed with a serrated spine	**Trygonidæ.**
VI. Pectoral fins do not extend on to the side of the head; snout with a detached pair of fins	**Myliobatidæ.**

Family I. PRISTIDÆ. (Saw-fishes.)

Snout much produced, flattened, and having a saw-like appearance, due to the existence of large teeth on its lateral edges. Trunk passing gradually into the tail.

The endoskeleton of a tooth of the saw of one of these fishes consists of from three to five hollow tubes, tapering towards their extremity, and covered with an osseous deposit which is perforated with fine holes. The teeth vary both in size and number in the same species, rendering them unsuitable as specific, but admissible as individual distinctions.

Great injuries can be inflicted by these fishes, which strike sideways with their formidable snouts; and although not personally a witness to the fact, I have been informed on native authority that large ones have been known to cut a bather completely in two. The largest example I saw was off the coast of Sind (*Pristis zysron*); it measured over 16 feet, the rostrum being 4 ft. 2 in. in length. A *P. cuspidatus*, 14 feet long, captured at Calicut, was found to have a liver weighing 185 lb., which was taken to the oil-factory when I was present.

At Gwádur, on the Mekran coast, I found that the fishermen of all religions presented the saws of these fishes at a small temple, where they were hung up inside or piled round the outside. The priest was expected to pray for success for the fishermen in their takes and a safe return to shore. At the Andaman Islands the aborigines wishing to make a suitable offering to their superintendent, attacked an enormous saw-fish, which they harpooned, and eventually secured at the risk of their lives. They presented him with the rostrum, which I now possess.

Geographical Distribution. Seas of tropical and temperate regions.

1. Genus PRISTIS, Latham.

Body elongated and depressed. Gill-openings inferior and of moderate width. Spiracle wide and posterior to the eye, which latter has no nictitating membrane. Nostrils inferior. Teeth minute and obtuse. Dorsal fins spineless, the first opposite or nearly opposite the ventrals; front edge of pectoral free.

Synopsis of Indian Species.

A. Caudal fin with a distinct lower lobe.
From 23 to 35 pairs of teeth on the snout; in the young their hinder edge is barbed. Dorsal fin arises behind the root of the ventral .. 1. *P. cuspidatus*, p. 37.
B. Caudal fin without any distinct lower lobe.
From 17 to 20 pairs of teeth on the rostrum, commencing at its base. Dorsal fin almost entirely in advance of ventrals .... 2. *P. perrotteti*, p. 38.
From 25 to 32 pairs of teeth on the rostrum, commencing near its base. Dorsal fin almost entirely posterior to the ventrals .... 3. *P. zysron*, p. 38.
From 24 to 27 pairs of teeth on the rostrum. Dorsal fin opposite ventral .... 4. *P. pectinatus*, p. 39.

38. (1.) Pristis cuspidatus. (Fig. 15.)

Pristis cuspidatus, *Latham, Tr. L. S.* 1794, ii, p. 279, pl. 26, fig. 3 (rostrum); *Day, Fish. India*, p. 728, pl. cxci, fig. 3 (see synon.).

Yahla, Tel.; *Vela meen*, Tamil.

Rostrum narrow and of about the same width throughout, armed with from twenty-three to thirty-five pairs of broad teeth, those on one side (generally the right) often exceeding in number those on the other. This dentition is absent in the fœtus, while

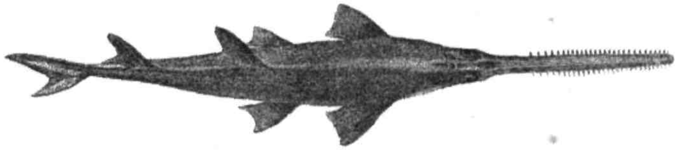

Fig. 15.—*Pristis cuspidatus.*

in the immature it only exists in the anterior three quarters of the snout, and in the adult a considerable portion of the base is unarmed. Usually the anterior six pairs of teeth are opposite one another, and the posterior teeth in the immature are mostly barbed behind. Mouth transverse, with a membranous valve (fringed in the young) behind the teeth in the upper jaw, and with a deep notch near the symphysis. The pupil is transverse, with a semicircular flap above and another below; these flaps are easily raised, depressed, or expanded, according to the stimulus of light received, which they can partially or entirely exclude; lens very soft. Spiracles large, nearly transverse, posterior to the eyes,

half a diameter of the eye in width. Nostrils situated about one and a half transverse lengths from the mouth; they have long triangular narrow valves in their upper, and a hem-like one at their lower margins; their distance asunder posteriorly equals their length, and is twice as much anteriorly. *Teeth*—small, longer than broad. *Fins*—the first dorsal commences just behind the ventral; the second dorsal midway between the posterior extremity of the first dorsal and the base of the caudal. The two dorsals are of equal size, their upper margins concave, and the posterior lobe of each produced. Posterior margin of the caudal deeply excavated so as to form two lobes. A keel passes along the tail, dividing the lateral from the abdominal surfaces. *Colour*—greyish-yellow above, whitish beneath. Iris golden, with a black edge.

Hab. Seas of India to the Malay Archipelago, ascending rivers; attaining 20 feet and upwards in length. The flesh is equally esteemed with that of the sharks. The fins are prepared and sent to China: oil is extracted from the livers, whilst the skins are useful for sword-scabbards or for smoothing down wood.

39. (2.) **Pristis perrotteti.**

Pristis perrotteti, *Müll. & Henle, Plagios.* p. 108; *Day, Fish. India*, p. 729, pl. cxci, fig. 1 (see synon.).

Kundah, Ooriah.

Rostrum of moderate breadth, rather narrow anteriorly, armed with from seventeen to twenty pairs of teeth, mostly about the same number on either side, and commencing at the base of the snout; the first four pairs being opposite one another, and the breadth of the base of each anteriorly being about equal to one third of the interspace. Spiracles placed very obliquely, from 1 to 1¼ diameters behind the orbit. *Teeth*—larger than in *P. cuspidatus* or *P. zysron*, oval, longer than broad. *Fins*—the first dorsal almost entirely in advance of the ventral; second dorsal commences nearly midway between the posterior extremity of the first dorsal and the base of the caudal; these two fins are of about equal size; inferior margin of the caudal with a faint indication of a lobe. *Colour*—reddish brown superiorly, becoming dull white along the abdominal surface; iris golden, with a black edge.

Hab. Tropical seas, entering rivers. In the Mahanadi river, Orissa, I observed it at least forty miles from the sea, far beyond the influence of the tides, where I obtained several specimens 4 ft. in length. In Orissa it is only eaten by the sweepers and the very lowest castes.

40. (3.) **Pristis zysron.**

Pristis zysron, *Bleeker, Batav. Gen. Verhand.* xxiv, *Plagios.* p. 55; *Day, Fish. India*, p. 729, pl. cxci, fig. 2 (see synon.).

Vella sorrah, Tamil.

Rostrum intermediate in width between *P. cuspidatus* and *P. perrotteti*, of about the same breadth throughout, and armed with from twenty-five to thirty-two pairs of teeth, of mostly the same number on either side; they commence just in front of the base of the snout, the posterior ones are much further apart than the anterior. *Teeth*—intermediate in size between *P. cuspidatus* and *P. perrotteti*. *Fins*—first dorsal almost entirely behind the ventrals; second dorsal as large as the first, or larger, is situated rather near to the root of the caudal, to which its posterior lobe almost reaches; caudal without a lower lobe. *Colour*—sandy-brown, becoming lighter beneath.

Hab. Seas of India to the Malay Archipelago; attaining at least 20 ft. in length. This species is perhaps more common in the seas of India than *P. cuspidatus*. It is especially abundant along the Mekran and Sind coasts, where it is much dreaded.

41. (4.) Pristis pectinatus.

Pristis pectinatus, *Latham, Tr. L. S.* 1794, ii, p. 278, pl. 26, fig. 2 (snout); *Day, Fish. India, Supplement*, p. 811 (see synon.).

Nga-tat-way, Burmese; *Khurra mach*, Chittagong.

Rostrum nearly twice as wide at its termination as at its base, and armed with from twenty-four to twenty-seven pairs of, generally, long teeth, not placed opposite one another. *Fins*—first dorsal commences opposite ventral, the second dorsal of about equal size to the first; no lower caudal lobe. *Colour*—as in the last.

Hab. Red Sea and through the Indian Ocean. One 24 ft. long asserted by fishermen to have been taken at Akyab.

Family II. RHINOBATIDÆ.

The disk slightly dilated laterally; the rayed portion of the pectoral fin not continued on to the snout. Trunk gradually passing into the tail, which is thickened and has a longitudinal fold along each side. Two well-developed dorsals, likewise a caudal fin. No electric organs.

These fishes are very destructive to marine crustacea and mollusks; and are said to congregate in large droves.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Genera.

Two dorsal fins, the anterior opposite the ventrals 1. RHYNCHOBATUS.
Two dorsal fins, the anterior situated far behind the ventrals .... 2. RHINOBATUS.

1. Genus RHYNCHOBATUS, Müller & Henle.

Syn. *Rhina*, sp., and *Rhinobatus*, sp., Bl. Schn.; *Rhamphobatis*, Gill.

Body depressed and elongated. Gill-openings inferior, narrow, and inside the base of the pectoral fin. Spiracles wide and behind the eyes, which latter have no nictitating membrane; snout rather elongated and acute; nostrils inferior, oblique, wide slits. Teeth obtuse, ridged; the dentary plate having an undulated surface. Dorsal fins spineless, the first opposite the ventrals; front edge of pectoral free, not extending to the head; caudal with a well-marked lower lobe.

Geographical Distribution. From the Red Sea and east coast of Africa through the seas of India to the Malay Archipelago and China.

Synopsis of Indian Species.

Snout elongated; few tubercles or spines on head or body. A black shoulder-spot and numerous white spots on upper surface	1. *R. djeddensis*, p. 40.
Snout broad, having a semicircular outline. Rows of large tubercles and spines on head and trunk. Brown	2. *R. ancylostomus*, p. 41.

42. (1.) Rhynchobatus djeddensis. (Fig. 16.)

Raja djiddensis, *Forsk. Descrip. Anim.* p. 18.
Rhynchobatus djeddensis, *Day, Fish. India*, p. 730, pl. cxcii, fig. 1 (see synon.).

Walawah Tenkee, *Nul Ulavi*, or *Tipi Ulavi*, Tel.; *Ránja*, Marathi; *Palunga* or *Parangan*, Tam.

Snout elongated, the distance between the mouth and end of snout equals one fourth to one fifth of the entire length excluding

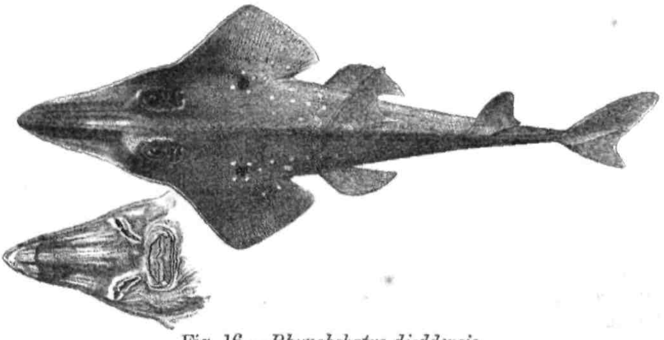

Fig. 16.—*Rhynchobatus djeddensis.*

the caudal fin, being shortest in adults. *Eyes*—rather large; the spiracle close behind the orbit. *Teeth*—oval, wider than broad, with a horizontal cusp across the centre of each; $\frac{40-42}{40-42}$, twenty to twenty-five vertical rows across the middle of both jaws. Dental plate with a central and a smaller lateral elevation; corresponding emarginations exist in the upper jaw. *Fins*—the first dorsal

commences opposite the centre of the base of the ventral. The second dorsal is half as far from the base of the caudal as from the posterior extremity of the first dorsal; and is smaller than the latter fin, but of the same shape. *Scales*—minute, of irregular shapes and sizes, keeled; a number of tubercles, directed backwards, exist in rows in some parts of the body; a supraorbital row extends from the anterior margin of each orbit round its upper edge to above the spiracle; a second passes from a central point between the termination of the last two and proceeds along the back to the base of the first dorsal, the tubercles on it being much further apart than in the other lines; from slightly behind the commencement of the dorsal line of spines is a short diverging row on either side, also a row on the shoulder, and two or three spines on the scapula. The lateral keel commences a little above the termination of the ventrals. *Colour*—the immature are dull grey above, whitish, sometimes tinged with red, beneath. A dark or black band on the upper eyelid and a dark spot beneath on either side of the snout; also there is usually, but not invariably, a black spot at the root of the pectoral, which may have several small white spots round it. The body and sometimes the pectoral fins are spotted with whitish or light grey. Iris golden. The adult is of a dull grey above and lighter on the abdomen.

Hab. Red Sea and east coast of Africa, seas of India to the Malay Archipelago, and beyond. The flesh is considered nourishing whether eaten salted or fresh, and oil from the liver is much esteemed. The young are captured along the Coromandel coast in large numbers about the month of March. This fish grows to at least six feet in length.

43. (2.) Rhynchobatus ancylostomus.

Rhina ancylostomus, *Bl. Schn. Syst. Ich.* p. 352, t. lxxii.
Rhynchobatus ancylostomus, *Day, Fish. India*, p. 730, pl. cxciii, fig. 3 (see synon.).

Mun ulava, "mud skate," Tam.; *Nalla dindi*, or *Pottila sora*, Tel.

Snout very broad with a semicircular outline. A longitudinal row of tubercles on each side of the head above the eyes continued on to the shoulders, and a median one along the back, with two short lateral rows between the last and the pectoral fin; a few tubercles round the front edge of the eye and below the spiracle. *Teeth*—$\frac{77}{75}$; twenty-two vertical rows in the centre of the upper and twenty-seven in the centre of the lower jaw. The dental surface deeply undulated, with one large median and a smaller lateral elevation in the lower jaw and with corresponding emarginations in the upper. The teeth are largest on the summit of each elevation; all are obtusely rounded, with several longitudinal ridges across each. *Colour*—dull brown, lighter beneath; the body and sometimes the fins covered with whitish spots; occasionally some tortuous black lines.

Hab. From the east coast of Africa through the seas of India to the Malay Archipelago and China. One 6 ft. 10 in. long was sent by Dr. Jerdon to the British Museum; in it were found the

remains of great numbers of crustacea of many kinds. The natives assert that this ray swims slowly just above the bottom of the sea not far from the shore, picking up what it can find.

2. Genus **RHINOBATUS**, sp., Bl. Schn.

Syn. *Syrrina*, Müll. & Henle.

Body depressed and elongated. Spiracles wide, behind the eyes. Snout elongated, the cranial cartilage produced and the interval between it and the pectoral fin filled by a membrane. Nostrils oblique and wide; the anterior nasal valves not confluent. Teeth obtuse, ridged. Dorsal fins spineless, both far behind the ventral; no lower caudal lobe.

Geographical Distribution. Tropical and subtropical seas. Individuals are exceedingly numerous along the coast of India, and prefer a sandy to a muddy bottom. Tickell observed that they have the singular habit of coming so close to the edge of the water that the retiring wave frequently leaves them exposed to the air, in which condition they contentedly remain allowing the surf to cover them and desert them alternately. They often select a smooth, sloping, sandy beach for this purpose, where they lie with their snouts pointed seawards, so that if danger approaches they wriggle seawards and swim away with the next wave.

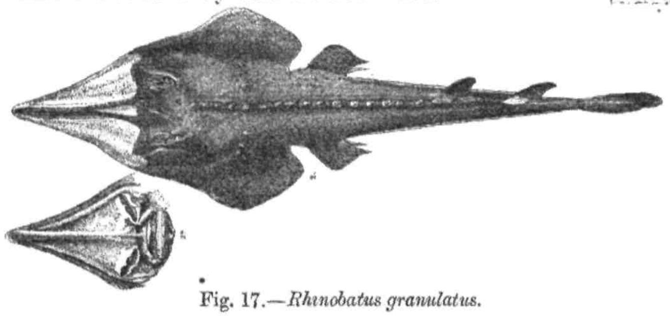

Fig. 17.—*Rhinobatus granulatus.*

Synopsis of Indian Species.

Snout elongated; a row of spines along the middle of the back	1. *R. granulatus*, p. 42.
Snout rather obtuse; a few blunted spines along the middle of the back	2. *R. halavi*, p. 43.
Nostrils very large, their distance apart at the base being less than half their length	3. *R. thouini*, p. 44.
Snout rather elongated; a row of tubercles along the middle of the back	4. *R. columnæ*, p. 44.

44. (1.) **Rhinobatus granulatus.** (Fig. 17.)

Rhinobatus granulatus, *Cuv. Règn. Anim.* ed. 2, ii, p. 396; *Müll. & Henle, Plagios.* p. 117, t. xxxviii; *Day, Fish. India*, p. 732, pl. cxcii, fig. 2 (see synon.).

Suttiwarah, Tel.; *Pur-run-gun*, Tamil; *Cun-da-ree*, Sind.; *Nga-man-haing*, or *Nga-man-kha*, Burmese; *Mattia byllia*, Chittagong.

Snout elongate, its length being from 4½ to 5½ in the total, and as a rule being longest in the immature; the width of the interorbital space varies from 2½ to 3½ in the length of the snout. Anterior nasal valve with no lateral dilatation. The distance between the external angles of the nostrils equals about two thirds or three fifths in the preoral portion of the snout; the two rostral ridges narrow and closely approximating in their anterior half or two thirds; mouth transverse. *Teeth*—$\frac{42}{32}$, dental plate with a central and lateral elevation in the lower, with corresponding depressions in the upper jaw: 20 to 22 vertical rows in the upper and 13 in the lower jaw opposite the symphysis. *Scales*—tubercles on the back, and a row of compressed spines along its middle, which become obsolete with age; some spines on the edge of the orbit and on the shoulder. In the young a row likewise along either side of the upper edge of rostral ridge. *Colour*—reddish grey superiorly, becoming dull white beneath.

Hab. Seas of India to the Malay Archipelago and Australia. This ray attains at least seven feet in length.

45. (2.) Rhinobatus halavi.

Raja halavi, *Forsk. Descr. Anim.* p. 19.
Rhinobatus halavi, *Day, Fish. India,* p. 731, pl. cxciii, fig. 4 (see synon.).

Páré, if young *Padangan,* Tam.

Snout rather obtuse, its length contained 7 to 8 times in the total. The width of the interorbital space 2¼ to 2⅓ times in the length of the snout. Anterior nasal valve not dilated laterally. The distance between the outer angles of the nostrils four fifths the preoral length of the snout; the length of the nostrils about equals the distance their bases are asunder. Rostral ridges divergent posteriorly, becoming confluent in their anterior half or two thirds. *Teeth*—transversely oval, with a slight ridge along the centre, the width of the plate above the symphysis of both jaws being one eighth of its length; $\frac{70}{66}$ rows of teeth, and fifteen vertical rows in the median line in either jaw. The dental plate almost straight. *Fins*—the two dorsals of about the same size, their distance asunder equalling the interspace between the second dorsal and the base of the caudal, the latter being 7½ to 8½ in the total length. *Scales*—somewhat trefoil-shaped and flattened, being rather largest along the median line of the back, which, however, is not spined, although a few tubercles almost form spines. *Colour*—reddish grey superiorly, becoming white beneath; fins and snout with a reddish tinge. Large examples have occasionally black blotches over them.

Hab. From the Mediterranean, west coast of Africa and Cape of Good Hope: also from the Red Sea through the seas of India to the Malay Archipelago and China. This species attains at least six feet in length.

46. (3.) **Rhinobatus thouini.**

Raie thouin, *Lacépède, H. N. Poiss.* i, p. 134, pl. i, figs. 3–5.
Rhinobatus thouini, *Müll. & Henle, Plagios.* p. 120; *Day, Fish. India*, p. 732, pl. cxc, fig. 4 (see synon.).

Snout of moderate extent, contained 5 or 6 times in the total length; the width of the interorbital space $2\frac{3}{4}$ in the length of the snout. Anterior nasal valves not dilated laterally. The distance between the outer angles of the nostrils equals two thirds of the length of the preoral portion of the snout; the length of the nostrils is more than twice the extent their bases are apart. Mouth straight. Rostral ridges confluent in almost their entire length. *Teeth*—small, upwards of one hundred rows in either jaw. *Fins*—the two dorsals of about the same size, high and pointed, the first if laid flat nearly reaching the base of the second dorsal; caudal $6\frac{1}{2}$ in the total. *Scales*—skin granulated with a row of compressed spines along the middle of the back and smaller ones over the shoulders and above the eyes. *Colour*—brown, becoming yellowish white beneath.

Hab. From the Red Sea through the seas of India to the Malay Archipelago. This species attains to $6\frac{1}{2}$ feet in length, according to Bleeker.

47. (4.) **Rhinobatus columnæ.**

Rhinobatus columnæ, *Bonaparte, Faun. Ital.* iii, pl. 152; *Müll. & Henle, Plagios.* p. 113; *Day, Fish. India, Supplement*, 1888, p. 811 (see synon.).

Snout rather elongated, the distance between the outer angles of the nostrils is equal to two fifths of the length of the preoral portion of the snout. Each anterior nasal valve connected to a fold of skin that passes towards the median line and so nearly joins that of the opposite side. The upper rostral ridges are convergent in front. Back finely granular, with a median row of small tubercles. *Colour*—brown; young examples have a white snout.

Hab. Mediterranean, the Indian and Atlantic Oceans.

Family III. TORPEDINIDÆ.

Trunk broad and disk smooth. Anterior nasal valves confluent and forming a quadrangular flap. Body gradually passing into the tail, which latter has a rayed dorsal (except in *Temera*) and caudal fin; a longitudinal fold along both sides. An electric organ situated between the pectoral fin and the head.

The upper surface of the electric organs in these fishes is positive and the lower negative.

Geographical Distribution. Tropical, subtropical, and temperate seas. In India the species of this family do not appear to be used as food.

Synopsis of Indian Genera.

Two dorsal fins; spiracles immediately behind the eyes .. 1. NARCINE.
One dorsal fin .... 2. ASTRAPE.

1. Genus **NARCINE**, Henle.

Disk distinct from the tail, which has a lateral fold on each side and is longer than the disk. Spiracles close behind the eyes: nasal valves confluent, forming a quadrangular flap. Teeth nearly flat, with a central point. Two dorsal fins, the anterior behind the ventrals and usually smaller than the posterior. An electric apparatus present.

It must be noted that an apparatus exists in fishes of the genus *Raia* which presents the anatomical characters of electric organs, and has been known for a long period.

Geographical Distribution. Tropical and subtropical seas.

48. (1.) **Narcine timlei.** (Fig. 18.)

Raja timlei, *Bl. Schn. Syst. Ich.* p. 359.
Narcine timlei, *Day, Fish. India,* p. 733, pl. cxcii, fig. 3 (see synon.).
Temeree and *Nalla Temeree,* Tel.

Outline of disk somewhat rounded, broader than long; along the side of the tail is a broad skinny keel reaching the base of the caudal fin. Caudal portion of fish rather longer than the body. Nasal valves confluent, forming a quadrangular skinny flap which is rather elongated in the middle. Spiracle just behind the orbit and not tuberculated on the edge. *Teeth*—flattened anteriorly, the internal ones with a small median cusp; the dental plate only embraces the central half of each jaw, the lips being thickened and continuous at the angles. The form of the dental plate varies, being either angular in the mandible, the angle pointing downward,

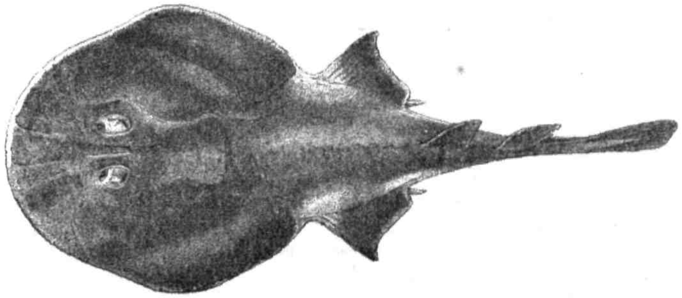

Fig. 18.—*Narcine timlei.*

or similar to what obtains in the upper jaw. *Fins*—the first dorsal usually commences just behind the ventrals, but occasionally over their posterior extremity, it is somewhat smaller than the second; in the young its apex forms an angle, which in the adult becomes rounded. The distance between the two dorsals equals that between the posterior dorsal and the caudal. The size and shape of the two dorsals is similar. Caudal with its hinder edge rounded

and confluent with its lower edge. *Colour*—body and fins reddish brown above, with numerous irregularly sized chocolate-coloured spots; lower surface white. Pupil triangular, apex below. Iris golden. In the immature the spots have a white margin. Some examples are marked all over with large brown blotches much wider than the ground-colours; in others no spots at all exist. These differences in colour do not depend on sex or age.

Hab. Seas of India to the Malay Archipelago. This fish attains at least eighteen inches in length.

2. Genus **ASTRAPE**, Müller & Henle.

Tail with a fold on either side. Spiracles close behind the eyes, which last are minute. Nasal valves confluent, forming a large quadrangular flap. Teeth flattened or with a central elevation, the dental plate extending slightly beyond the outer edge of the jaws. A single dorsal fin on the tail; caudal well developed. An electric apparatus on the side of the head between it and the pectoral fin.

Geographical Distribution. Seas of India to the Malay Archipelago and China, also the Cape of Good Hope and Madagascar.

49. (1.) **Astrape dipterygia.** (Fig. 19.)

Raja dipterygia, *Bl. Schn. Syst. Ich.* p. 359.
Astrape dipterygia, *Day, Fish. India*, p. 734, pl. cxcii, fig. 4 (see synon.).

Zinzina, Marathi; *Timiri tiki*, Tel.

Disk rounded, as wide as long, extending posteriorly to over the anterior margins of the ventrals. Tail shorter than the body; a

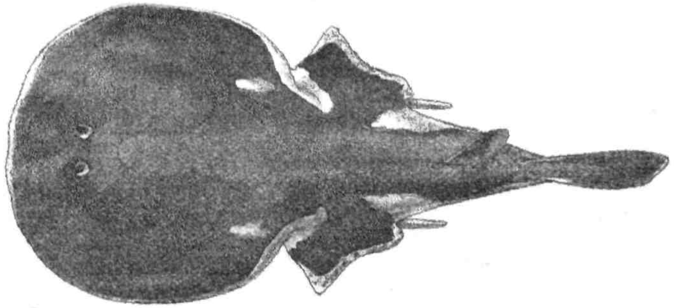

Fig. 19.—*Astrape dipterygia.*

low keel along the lateral edge of the former. Snout short. Spiracles smooth, close to and much larger than the eyes; vent slightly nearer to the head than to the posterior extremity of the caudal fin. *Teeth*—pointed, with tetragonal bases; they project slightly beyond the margin of the jaws. *Fins*—ventrals with their angles acute in the young, rounded in the adult. Caudal rounded, its

upper and lower portions confluent. *Colour*—dull reddish olive above, whitish below. A white spot near each side of the posterior end of the head, another above the end of the ventral, and generally a third at the root of the caudal; ventral with a white edge.

Hab. Seas of India to the Malay Archipelago, China and Japan. This species attains at least ten inches in length.

Family IV. RAIIDÆ.

Disk broad, rhombic; tubercules or spines usually present. The pectorals extend to the snout. The body passes gradually into the tail, which has a longitudinal fold on either side. No serrated caudal spine. Electric organs absent *.

In the year 1815 Colonel Montagu drew attention to a sexual character which was observable in some species of these fishes, in which the teeth were blunted in the females and pointed in the males. Another sexual character is that of spines on the body which are temporarily developed during the breeding-season.

Geographical Distribution. Seas of both hemispheres, but more numerous in the northern; it possesses but few representatives along the coasts of India, and seems to be absent from the Red Sea.

1. Genus **PLATYRHINA**, Müller & Henle.

Disk rhombic, with a fold on either side; tail distinct. Nasal valves distinct. Two dorsal fins on the tail; caudal well developed; ventrals separated one from the other. Body covered with rough asperities and spines.

Geographical Distribution. Seas of India to China and Japan.

50. (1.) **Platyrhina schonleinii.**

Platyrhina schonleinii, *Müll. & Henle, Plagios.* p. 125, t. xlv; *Day, Fish. India*, p. 735 (see synon.).

Disk subcircular; snout obtuse; tail as long as the disk. Dental plate undulating; three elevations in the lower and three corresponding depressions in the upper jaw. Nostrils wide apart. A row of strong spines and also smaller lateral ones along the median line of the back and tail; some more along the edge of the orbit and on the shoulder. *Colour*—brown, covered with light blotches; said sometimes to have dark cross bands and large dark spots.

Hab. Coromandel coast of India. A male example, 27½ inches in length, was in the Madras Museum.

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* See remarks to genus *Narcine*, p. 45, ante.

Family V. TRYGONIDÆ.

Disk wide; the pectorals continued to the extremity of the snout, where they become confluent. Tail long and slender, without any lateral folds. Vertical fins, if present, imperfectly developed, or they may be modified into a serrated spine.

The forms with armed tails, generally termed "sting rays," occasion exceedingly dangerous injuries, not merely owing to the jagged nature of the caudal spines, but apparently also to the presence of some irritating foreign substance, which is carried into the wound.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Genera.

Tail long and spineless. Body densely covered with tubercles	1. UROGYMNUS.
Tail long, armed with a serrated spine. Teeth flattened	2. TRYGON.
Tail long, armed with a serrated spine, and having a broad lower cutaneous fold continued to its termination	3. TÆNIURA.
Body very broad, tail very short and armed with a serrated spine. Teeth with from one to three cusps	4. PTEROPLATEA.

1. Genus **UROGYMNUS**, Müller & Henle.

Syn. *Anacanthus*, Ehren.; *Rhachinotus*, Cantor.

Disk subcircular; tail long and distinct, destitute of any spine, but with a narrow inferior fold; pectorals united anteriorly. Teeth flattened. Body covered with osseous tubercles, amongst which are sharp conical spines.

Geographical Distribution. From the Red Sea and east coast of Africa, throughout the seas of India to the Malay Archipelago.

51. (1.) **Urogymnus asperrimus.**

Raja asperrima, *Bl. Schn. Syst. Ich.* p. 367.
Urogymnus asperrimus, *Day, Fish. India*, p. 736, pl. cxcv, fig. 1 (see synon.).
Moollan tiriki, Tam.

Disk nearly as wide as long; snout scarcely projecting. Body densely covered with small heart-shaped scales, between which are numerous thorns which are generally erect, and are continued posteriorly to the first fifth of the tail, where they cease. On the pectoral fins are numerous small conical spines, irrespective of those over the body amongst the tubercles. *Colour*—greenish above, white beneath.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago. One, 2 feet across the disk, existed in the Madras Museum. This species is said to attain to 4 or 5 feet in length.

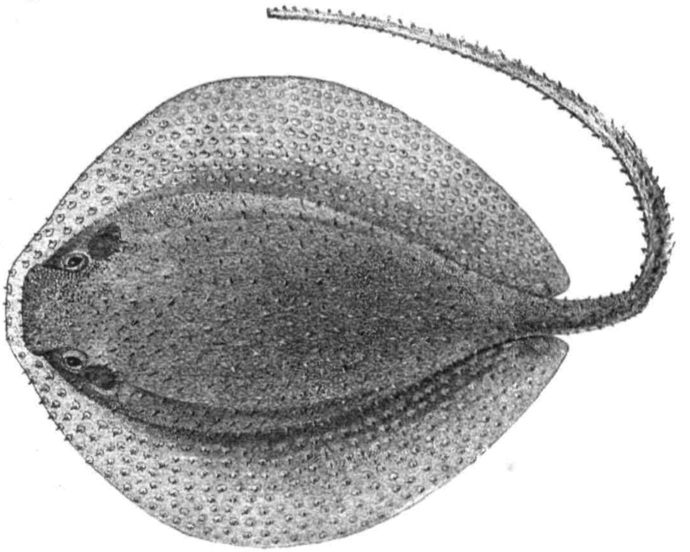

Fig. 20.—*Urogymnus asperrimus.*

2. Genus **TRYGON**, Adanson.

Syn. *Himantura, Hemitrygon,* and *Hypolophus,* Müll. & Henle; *Paratrygon,* Duméril.

Pákat, Maráthi.

Disk oval or rhomboidal; tail elongated and tapering. Nasal valves coalescent, forming a quadrangular flap. Teeth flattened, or with a central point or transverse ridge. Pectoral fins united anteriorly; tail destitute of a fin, or if with a cutaneous fold, such does not extend to its extremity; it is armed superiorly with one or two lanceolate spines that are serrated on both sides. Body smooth or with tubercles.

In this genus the colours in individuals of the same species are subject to considerable variation, and this is not invariably due to age. The character of the tubercles and their extent have also been (as I think erroneously) employed to characterize some species: thus one, *Trygon chindrakee* (Cuv.), Bleeker, is a form without tubercles or spines, except on the tail; *T. polylepis,* Bleeker, has small tubercles in the interorbital space, a narrow band along the back with a few indistinct enlarged ones, but none

on the tail; *T. walga*, Müll. & Henle, has the interorbital space and back covered with small tubercles, no larger ones in the median line, but a series of short spines between the root of the tail and the larger spine. Now all these forms, with every intermediate variation, occur, and the smooth body usually confined to the young may be persistent in the adult.

Synopsis of Indian Species.

A. Lower dental laminæ somewhat pointed, the upper being angularly bent for their reception. Tail with a cutaneous fold. (*Hypolophus.*)	
A broad fold along lower surface of tail. Upper part of body covered with flat tubercles	1. *T. sephen*, p. 50.
B. Dental laminæ transverse; if undulating, slightly so. Tail with a cutaneous fold. (*Trygon.*)	
Snout pointed. Tail three times as long as disk. Tubercles few	2. *T. bennetti*, p. 52.
Tail half longer than disk. Body nearly smooth. Blue ocelli on upper surface	3. *T. kuhlii*, p. 52.
Tail scarcely as long as body. Tubercles few..	4. *T. imbricata*, p. 52.
Snout very pointed and produced. A few tubercles in median line of back	5. *T. zugei*, p. 52.
C. Dental laminæ transverse; if undulating, slightly so; tail without a cutaneous fold. (*Himantura.*)	
Snout rather pointed. Tail very long. One or more large tubercles in middle of back. Brown or spotted	6. *T. uarnak*, p. 53.
Tail twice as long as disk. A row of pointed tubercles on the back, which is spined all over	7. *T. marginatus*, [p. 54.
Snout very pointed. Tail three to four times as long as disk. A central and several smaller tubercles on the back	8. *T. bleekeri*, p. 54.
Snout pointed. Tail rather longer than disk. Tubercles variously disposed	9. *T. walga*, p. 55.

52. (1.) Trygon sephen. (Figs. 21, 22.)

Raja sephen, *Forsk. Descr. An.* p. 17.

Trygon sephen, *Day, Fish. India*, p. 740, pl. cxcv, fig. 2 (see synon.).

Adavalan tiriki, Tamil; *Velugiri tenkee* and *Wolga tenkee*, Tel.; *Gováł pákat*, Maráthi.

Disk rather broader than long; the length of the tail three to four times that of the body. Snout most obtuse in adults. *Teeth*—lower dental laminæ somewhat pointed, the upper angularly bent for their reception; $\frac{33}{25}$ rows transversely, and $\frac{20}{25}$ vertically opposite the symphysis; they are all flattened, those in the centre of the upper jaw being the smallest. *Fins*—tail with a broad lower cutaneous fold; there may be one or two serrated spines

situated rather behind its anterior third. *Scales*—upper surface of the head and body and base of tail covered by thick, concave, or flat-headed, several-sided tubercles; in the scapular region and

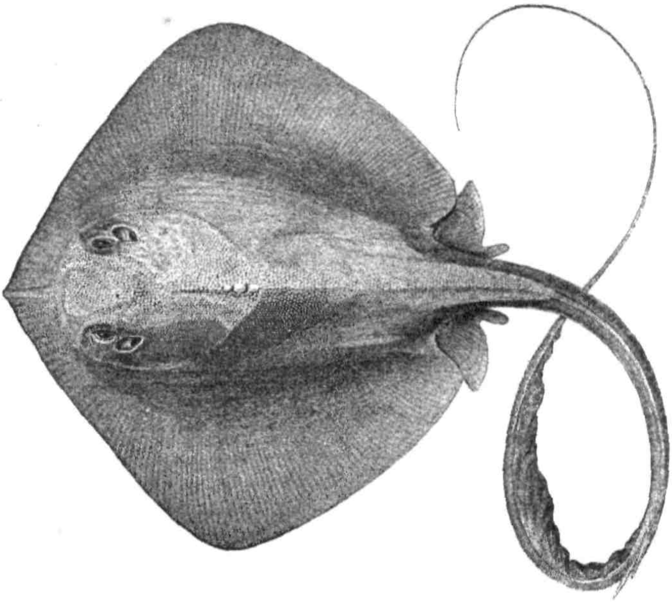

Fig. 21.—*Trygon sephen.*

central line of the back are two large, smooth, approximating tubercles in the young, and three in the adult, the middle and largest of which is usually oval, the second in size posterior and heart-shaped, the anterior or smallest round or heart-shaped. *Colour*—the upper surface of the immature is reddish brown; but in the adult lead-coloured, becoming black in the posterior two thirds of the tail. Some examples have a row of black blotches near their outer margin.

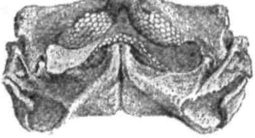

Fig. 22.—Teeth of *Trygon sephen.*

Hab. Red Sea, through the seas of India to the Malay Archipelago, and beyond. This fish grows to a large size. The jaws represented in the figure (22) were from an example 5 ft. 10 in.

across the disk. In its stomach were found crustacea, mollusks, &c. *T. sephen* is most common during the south-west monsoon, when it approaches the shore.

53. (2.) **Trygon bennetti.**

Trygon bennetti, *Müll. & Henle, Plagios.* p. 160, t. liii; *Day, Fish. India*, p. 739 (see synon.).

Disk about as broad as long; tail about three times as long as disk, and with a low cutaneous fold along its inferior surface. Snout somewhat pointed. Eyes nearer together than to the end of the snout. A tubercle in the middle of the back in adults, with some flat ones around it, which extend backwards to the caudal spine; but the young are quite smooth. *Colour*—a pale fleshy-red, which becomes almost white in parts, the tail being darker near its extremity.

Hab. Seas of India to China and beyond.

54. (3.) **Trygon kuhlii.**

Trygon kuhlii, *Müll. & Henle, Plagios.* p. 164, pl. li; *Day, Fish. India*, p. 739, pl. cxciii, fig. 2 (see synon.).

Kunnoo tirike and *Shemen tenkee*, Tel.

Disk broader than long; tail about one half longer than the disk. Snout somewhat obtuse, its length equal to or slightly exceeding the breadth of the interorbital space. Two appendages on the floor of the mouth. *Teeth*—dental plate more undulated in the upper than in the lower jaw. *Fins*—a cutaneous fold along the tail both above and below, caudal spine well developed. *Colour*—above of a dull brown, covered with numerous small black spots and larger rounded blue ocelli, each having a rather dark outer edge.

Hab. East coast of Africa, seas of India to the Malay Archipelago. This ray attains to at least $5\frac{1}{2}$ inches across the disk at Madras.

55. (4.) **Trygon imbricata.**

Raja imbricata, *Bl. Schn. Syst. Ich.* p. 366.
Trygon imbricata, *Day, Fish. India*, p. 739 (see synon.).

Disk as broad as long, snout produced and pointed; tail scarcely as long as the body, with low upper and inferior cutaneous folds. Small tubercles on the nape and back, with a row of conical spines on the shoulder and back; while along the tail as far as the spine are large tubercles intermixed with smaller ones.

Hab. Coromandel coast of India.

56. (5.) **Trygon zugei.**

Trygon zugei, *Müll. & Henle, Plagios.* p. 165, t. liv; *Day, Fish. India*, p. 739, pl. cxc, fig. 3 (see synon.).

Chumbara kah, Tam.

Disk about as broad as long, with the snout very much produced

and acutely pointed, its length being about $\frac{1}{3}$ that of the disk; tail equal to $1\frac{1}{2}$ or twice the length of the disk. Eyes small; interorbital space concave. *Teeth*—dental laminæ undulated. *Fins*—a distinct cutaneous fold along the lower surface of the tail, commencing opposite the base of the spine; there is likewise a fold along the upper surface of the tail. A strong and long spine, serrated in its last third, is situated at about the commencement of the second quarter of the tail, and anterior to it a row of small spines; the body otherwise smooth. In some examples a row of tubercles exists along the median line of the back. *Colour*—dull brown superiorly, the edge of the fins black.

Hab. Seas of India to the Malay Archipelago, and Japan.

57. (6.) Trygon uarnak.

Raja uarnak, *Forsk. Descr. Anim.* p. 18.

Trygon uarnak, *Müll. & Henle, Plagios.* p. 158; *Day, Fish. India*, p. 737, pl. cxciv, fig. 1 (see synon.).

Sona kah tiriki, Tam.; *Puli tenke*, Tel.; *Sankush*, Ooriah; *Lek kyouk*, Burmese; *Hankoos*, Chittagong.

Disk about as broad as long, snout pointed and rather prominent; tail from three to four times as long as the body. Iris with a well-developed superior flap. *Teeth*—dental laminæ undulating. *Fins*—no cutaneous folds on the tail, which is armed with a serrated spine situated about $\frac{1}{2}$ the length of the disk from the root of the tail. *Tubercles*—vary in different specimens, absent in the very young: in those with a disk of about 6 inches across there are two or three rows of widely separated oval tubercles on either side of the head, internal to the eyes, and meeting on the occiput, from thence towards the scapula is a single row of larger and more widely separated ones. In the middle of the back three large closely approximating scales or tubercles, the centre one heart-shaped, the anterior round, and the posterior almost heart-shaped. In some specimens, of a large size, there are also numerous distant thorns on the tail, which may disappear with age. In specimens with a disk of 3 feet across, the head, back, and sides are covered with smooth, roundish scales, having intermediate smaller ones. *Colour*—varying according to age: up to the period when the breadth of the disk is about 9 inches the body is of a yellowish brown, darkest along the back, and the abdomen white: a short distance beyond the commencement of the tail it is irregularly annulated with alternate narrow light brown, and broad or narrow dark brown rings. With increasing age black spots commonly appear on the body, and when it has attained the width of 3 feet across its disk it is light brown or greenish olive, covered with lighter and in some almost white spots, or reticulated with white lines, whilst the anterior extremity of the tail also shows the remains of the rings. The adult is uniformly brownish or greenish olive. Iris golden. Occasionally there are light spots on the posterior portion of the disk.

Hab. Red Sea, seas and estuaries of India to the Malay Archipelago, and China, also the Cape of Good Hope. The immature are frequently captured in the back-waters, and wounds from their caudal spines are much dreaded. The species attains a large size; 5 feet or more across the disk. The late Sir W. Elliot observed that from a female of this species 13 feet long (including the tail 8 feet 9 in.) a young was removed perfectly formed and of the same colour as its mother. In the cold season, as about October, these fish are frequently perceived springing out of the water for some distance in the same manner as trout do just prior to breeding. They devour large quantities of small fish, crustacea, mollusks, &c.

58. (7.) **Trygon marginatus.**

Trygon marginatus, *Blyth, J. A. S. B.* xxix, 1860, p. 38; *Day, Fish. India*, p. 738 (see synon.).

Disk slightly broader than long, tail from one half longer than the disk to nearly twice as long. The width of the interorbital space equals the length of the snout. Tubercles sparsely set all over the upper surface, but a little larger along the median line, where they appear like small limpets; an irregular row of pointed tubercles on either side of the middle line of the back; tail tuberculated as far as its spine, but destitute of any fin. *Colour*—grey above; buffy white below, with a dark border, except in front.

Hab. Hooghly at Calcutta. I examined an example in which the disk was 16 inches across and 15 long; Blyth observed one specimen which was 52, and another 60, inches across the disk, and the tubercles were extended on to the edge of the disk and even to its under surface. This would therefore appear to be a result of age.

59. (8.) **Trygon bleekeri.**

Trygon bleekeri, *Blyth, J. A. S. B.* xxix, 1860, p. 41; *Day, Fish. India*, p. 738, pl. cxcv, fig. 3 (see synon.).

Pakat, Maráthi; *Seman tirike*, Tam.

Tail from three to four times as long as the disk. Snout prolonged and pointed. Width of interorbital space equal to $\frac{1}{2}$ or $\frac{1}{3}$ the length of the snout anterior to the eye. A large round tubercle in the middle of the back, and commonly before it three smaller ones triangularly disposed, and three similarly placed behind it. Tubercles sometimes present along the upper surface of the tail to the caudal spine, from whence, in adults, they are continued to its extremity. *Colour*—"Brown above and below, with a narrow white median longitudinal patch on the abdomen" (*Blyth*). Sometimes this ray is brown above with the margins of the disk dark.

Hab. Bengal. Blyth observed one 25 inches long to base of tail, the tail 72 inches; another 15 and 56 inches.

60. (9.) Trygon walga.

Trygon walga, *Müll. & Henle, Plagios.* p. 159, t. li; *Day, Fish. India*, p. 738, pl. cxciv, fig. 3 (see synon.).

Isacurrah tenkee, Tenkee shindraki, Tel.

Disk about as broad as long, with the snout pointed and acutely projecting, more so in some examples than in others. Eyes smaller in the adult than in the young. Interorbital space concave. *Teeth*—small, having a transverse elevated ridge along each. Dental laminæ undulated. *Fins*—no cutaneous folds on the tail, the length of which is rather longer than the disk. One or two (sometimes more) large serrated spines on the tail at the commencement of its second third; between this and the base of the tail exists a median line of about seven short spines. *Scales*—interorbital space, and a varying width along the middle of the back and also on the tail covered with numerous fine tubercles; there are usually no larger ones, but in some examples there is one larger on the centre of the shoulder, in others a few more anterior to it. Neither the number, size, character, nor extent of the distribution of the tubercles and spines depends on age or sex, adults even may be without any of either. In one example (a male) the band of tubercles along the back is very narrow, a row of large ones exists in the median line of the scapular region, and four along the back of the tail. This would be intermediate between *T. walga* and *T. polylepis*. Another example has a row of small spines all along the first third of the back of the tail, and a moderately sized, rather compressed median scapular spine with six smaller ones anterior to it; a very wide band of tubercles exists along the back. One example has the smaller caudal spine very well developed, a very narrow row of tubercles along the back, and a central scapular tubercle. Another has only a few small tubercles and one central spine in the scapular region, some between the eyes, and some fine spines between the base of the tail and the two large spines. Young examples are often destitute of tubercles or armature except the caudal spines, and this immature character may be seen in some adults. *Colour*—dull grey or brown superiorly, white beneath.

Blyth has observed that the males are larger than the females and have proportionately longer tails; very commonly the second caudal spine (more especially of the females) does not extend beyond the first one. Some have a small lanceolated tubercle on the centre of the dorsal surface, others two or more, even to a series of five or six along the median line.

Hab. From the Red Sea, through the seas of India to the Malay Archipelago.

3. Genus **TÆNIURA**, Müll. & Henle.

Disk oval or rhomboidal; tail elongated and tapering. Nasal valves coalescent, forming a quadrangular flap. Pectoral fins united anteriorly; tail with a broad lower cutaneous fold continued

to its extremity. Body and tail either smooth or furnished with tubercles.

Geographical Distribution. From the Red Sea and east coast of Africa through the seas of India to the Malay Archipelago and tropical America.

61. (1.) Tæniura melanospilos *.

Tæniura melanospilos, *Bleeker, Nat. Tyds. Ned. Ind.* 1853, iv, p. 513; *Day, Fish. India*, p. 740 (see synon.).

Jiluga tirike, Tel.

Disk rather broader than long; its upper surface smooth. Tail very thick at its base, with two strong flattened elongated spines (upper 9½, lower 5½ inches long) serrated externally. From opposite these spines on the lower surface of the tail commences a broad cutaneous fold, which is continued to the extremity of the tail, and on its upper surface are numerous tubercles of the same character as on the tail. The colours have not been noted.

Two examples were captured in 1853 off the Coromandel coast, where they were said by the fishermen to be very rare. One had its disk 4 ft. 11 in. long and 5 ft. 11 in. broad; the other disk was 4 ft. 1 in. long by 5 ft. 11 in. wide. Inside the stomach of the latter were found the remains of some small crabs and a squilla. It was, however, expressly stated that the body was smooth, but the tail covered with rough tubercles, all of which had a stellated base.

Hab. Red Sea and Coromandel coast of India to Batavia.

4. Genus PTEROPLATEA, Müll. & Henle.

Syn. *Ætoplatea*, Müll. & Henle.

Body at least twice as broad as long; tail thin, generally shorter than the body, with or without a rudimentary fin, but having a serrated spine; spiracles with or without a tentacle; nasal valves confluent, and forming a quadrangular flap. No papilla at bottom of the mouth. Teeth with from one to three cusps. Pectoral fins united in front. Skin smooth or tubercular.

Geographical Distribution. Tropical and temperate seas.

62. (1.) Pteroplatea micrura. (Fig. 23.)

Raja micrura, *Bl. Schn. Syst. Ich.* p. 360.
Pteroplatea micrura, *Day, Fish. India*, p. 741, pl. cxciv, fig. 2.

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* Tæniura lymma, Forskål.

Disk rather longer than broad; a few spines along the middle of the back. Two long papillæ at the bottom of the mouth. *Colour*—grey, with round blue dark-edged spots; a bluish band along either side of the tail.

Hab. Red Sea, coast of Africa to the Malay Archipelago; this ray consequently may probably be found off the coast of India.

Peroom tirik, or *Tappor kooti tiriki*, Tamil; *Tappu cooti* and *Tenkee nsul*, Tel.; *Lek kÿouk temengnee*, Burmese.

Disk about twice as wide as long; tail as long as disk in young, but shorter in adults. No tentacle to spiracle. *Teeth*—with a single pointed cusp. *Fins*—one or two small spines on caudal fin. Skin smooth. *Colour*—reddish brown; tail annulated with white and brown; superiorly, in the centre of each light ring, there is generally a brown spot. The young are covered all over with small brown spots. A figure exists amongst Sir Walter Elliot's drawings of Madras fish of an example covered with light round spots.

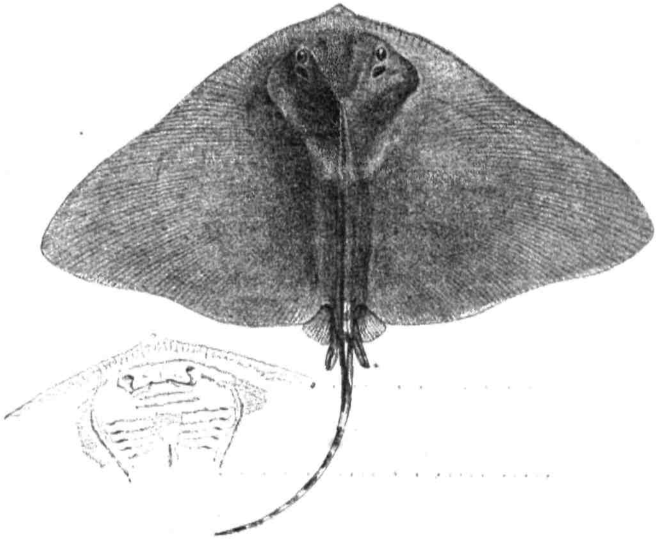

Fig. 23.—*Pteroplatea micrura.*

Hab. Seas of India to the Malay Archipelago, and beyond. Jerdon obtained one in which the disk was 6 feet across and 3 feet long.

Family VI. MYLIOBATIDÆ.

Pectoral fins large, developed along the sides of the body, occasioning the latter to appear very broad; these fins are not present on the sides of the head, but reappear at the end of the snout as a pair of detached fins.

These fish, many of which attain to a large size, are variously known as "Devil-fishes," "Sea-devils," "Bat-fishes," "Eagle-rays," &c.

Synopsis of Indian Genera.

A. Teeth large, flattened, tessellated.
 Fins on head meet in the form of a soft appendage in front of snout. Teeth in several series, the middle being the broadest .... 1. MYLIOBATIS.
 Only one series of very broad teeth .... 2. AËTOBATIS.
 Fins on either side of snout form a lobe .... 3. RHINOPTERA.
B. Teeth small; cephalic fins forming an appendage on either side of snout.
 Teeth in both jaws .... 4. DICEROBATIS.

1. Genus MYLIOBATIS, Cuvier.

Head distinct from disk; snout with a soft prolongation, internally supported by fin-rays; nasal valves coalescent, forming a quadrangular flap. Teeth hexagonal, flat, the central broader than long; the external rows narrow *. Tail very long and whip-like, having a dorsal fin near its base, and usually a serrated spine posterior to the fin. Body smooth or tuberculated above.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Species.

Body smooth. The young with five blue cross bands on the upper surface, disappearing with age............................ 1. *M. nieuhofii*, p. 58.
A row of small tubercles in the median line of the scapular region. Ocelli with brown margins in the posterior half of the upper surface of disk .... 2. *M. maculata*, p. 59.

63. (1.) Myliobatis nieuhofii.

Raja nieuhofii, *Bl. Schn. Syst. Ich.* p. 364.
Myliobatis nieuhofii, *Day, Fish. India*, p. 742 (see synon.).
Tuppa koollee or *Chuppa tirike*, Tamil; *Mookarah tenkee*, Tel.

Disk about twice as broad as long; tail about three times as long as disk. Fleshy prolongation of snout short: no horn on orbit. Body smooth. *Fins*—dorsal situated at commencement of base of tail, opposite the end of the insertion of the ventrals; no spines posterior to it. *Colour*—olive superiorly, tinged externally with a reddish hue and a dark outer margin to the disk. The young have about seven blue bands across the disk and two more between or close to the eyes. As the fish increases in size, first the bands on the head disappear and finally those on the body.

Hab. Seas of India to the Malay Archipelago and Japan.

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* In the young the rows of teeth are of equal size and regularly hexagonal.

64. (2.) Myliobatis maculata *.

Myliobatis maculata, *Gray & Hardw. Ill. Ind. Zool.* ii, pl. 101; *Day, Fish. India*, p. 742 (see synon.).

Disk about twice as wide as long; tail more than three times as long as the disk. Fleshy prolongation of snout short, no horn on orbit. Body with a row of small tubercles along the median line of the back in the scapular region. *Fins*—dorsal situated at the commencement of the base of the tail, behind the end of the insertion of the ventrals; no spine posterior to it. *Colour*—greenish brown, with round blue spots in the posterior half of the disk. Tail white with black rings.

Hab. Seas of India to the Malay Archipelago.

2. Genus AËTOBATIS, Müll. & Henle.

Syn. *Stoasodon*, Cantor.

Head distinct from disk; snout with a soft prolongation, internally supported by fin-rays. Nasal valves usually distinct, each forming a long flap, or they may be united into one quadrangular flap. Teeth in a single row, hexagonal, broad, flat, with the lower dental laminæ projecting beyond the upper. Tail very long and whip-like; dorsal fin present near its base, and a serrated spine posterior to the fin.

Geographical Distribution. Seas of the tropics.

65. (1.) Aëtobatis narinari. (Fig. 24.)

Raja narinari, *Euphrasen, Vet.-Ak. Nya Handl.* 1790, xi, p. 217.
Aëtobatis narinari, *Day, Fish. India*, p. 743, pl. cxciv, fig. 4 (see synon.).

Eel-tenkee, Tel; *Currooway tiriki*, Tam.; *Ra-ta-charm-dah*, Andam.

The comparative proportions of this fish vary greatly with age; the distance from the mouth to the anus equals about half the width of the disk. Nasal valves in some examples separate, each as a long flap; in other examples the valves unite and form a quadrangular flap the lower edge of which is fringed; the spiracle wider than the orbit. *Teeth*—broad, flat, and in a single row, those in the lower jaw may be angularly bent or nearly straight; the lower dental plate projects beyond that in the upper jaw. *Fins*—the dorsal arises opposite the base or centre of the ventral,

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* Myliobatis vespertilio, Bleeker.

Disk at least twice as broad as long; snout somewhat produced; no horn on orbit. No tubercles on back. *Fins*—dorsal begins close to the end of ventrals, beyond which it does not extend. *Colour*—a network of black lines on the back and root of the pectoral fin.

Hab. Red Sea and the Malay Archipelago; therefore probably exists off the coast of India.

the latter fin being about three times as long as broad. Tail thre or four times as long as the body, triangular in shape as far as the spine, which is serrated and situated just behind the termination

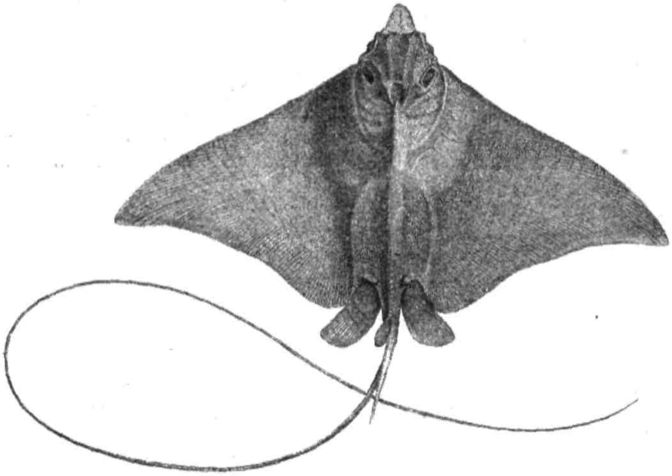

Fig. 24.—*Aëtobatis narinari.*

of the dorsal fin; beyond the spine the tail is compressed; in this, as well as in some other species, there is occasionally a second spine on the tail a little behind the root of the first. Body smooth. *Colour*—greyish olive, sometimes greenish olive or leaden grey above, and usually covered from beyond the occiput with numerous dirty-white or bluish spots edged with black; abdominal surface white; tail black. Iris golden green, teeth greenish yellow. In the immature the back is of a deep leaden colour, and the spots hardly apparent.

Hab. Red Sea, seas and estuaries of India to the Malay Archipelago, and beyond. Eaten by the natives. Is captured to upwards of 6 feet in width.

3. Genus **RHINOPTERA**, Kuhl.

Syn. *Mylorina* and *Micromesus*, Gill.

Head distinct from the disk, but with a pair of rayed appendages

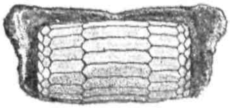

Fig. 25.—Teeth of *Rhinoptera javanica.*

on the lower edge of the snout. Nasal valves confluent, forming

a broad flap. Teeth broad, flat, in five or more rows, the central being the broadest. Tail whip-like, having a dorsal fin armed with a serrated spine.

Geographical Distribution. Tropical and contiguous seas.

Synopsis of Indian Species.

Nine series of teeth in upper jaw, and seven in the lower	1. *R. adspersa*, p. 61.
Seven rows of teeth in each jaw, the three central series being much the longest	2. *R. javanica*, p. 61.

66. (1.) **Rhinoptera adspersa.**

Rhinoptera adspersa, *Müll. & Henle, Plagios.* p. 183; *Day, Fish. India*, p. 744 (see synon.).

Mutta tiriki or *Kurivi tiriki*, Tamil.

Disk about twice as wide as long; tail about three times as long as disk. Notch on snout shallow. *Teeth*—nine rows in the upper and seven in the lower jaw, the teeth in the central row of the upper jaw $2\frac{1}{2}$ to 3 times wider from side to side than from back to front, but not so wide as those in the next row. *Fins*—dorsal, situated at the base of the tail, and immediately behind it a strong serrated spine. Upper surface of body covered with fine stellate tubercles. *Colour*—greenish brown superiorly, becoming lighter at the edges of the disk.

Hab. Seas of India.

67. (2.) **Rhinoptera javanica.** (Fig. 25, teeth *.)

Rhinoptera javanica, *Müller & Henle, Plagios.* p. 182, t. lviii; *Day, Fish. India*, p. 744, pl. cxcv, fig. 4 (teeth).

Disk from about $1\frac{2}{3}$ to twice as broad as long; tail nearly twice as long as disk. Notch on snout shallow. *Teeth*—seven rows in both jaws, those in the central row being four or five times wider than long (in the antero-posterior direction), and rather more than twice as wide as the row on either side. The outer rows are hexagonal and narrow; those in the lower jaw rather narrower than those in the upper. *Fins*—dorsal situated at the base of the tail, and immediately behind it a serrated spine. *Colour*—greenish superiorly, white beneath.

Hab. Seas of India to the Malay Archipelago.

4. Genus **DICEROBATIS**, Blainville.

Syn. *Cephaloptera* and *Mobula*, A. Duméril.

Pectoral fin not extended on to the sides of the head, which latter is truncated in front, whilst on either side is a forwardly-

* Mr. A. S. Woodward (Ann. Mag. Nat. Hist. 1888, i. p. 281) has shown that the dentition of these fishes may be abnormally altered.

pointing horn-like projection, which is internally supported by fin rays. Nostrils not confluent. Teeth in jaws very small, flat, or tuberculated, and in many rows. Tail whip-like, with a dorsal fin situated above and between the ventrals, armed with or destitute of a serrated spine.

The designation *Sea-devils* has been given by some authors to fishes belonging to this genus; it is also frequently applied to several other forms of armed rays and fishes which inflict dangerous wounds.

Geographical Distribution. Tropical and temperate seas.

Synopsis of Indian Species.

Teeth numerous in both jaws . . . . 1. *D. eregoodoo*, p. 62.
Teeth $\frac{24-38}{34-58}$ . . . . 2. *D. kuhlii*, p. 63.

68. (1.) **Dicerobatis eregoodoo.** (Fig. 26.)

Eregoodoo tenkee, *Russell, Fish. Vizag.* i, pl. ix.; *Cuvier, Règne Anim.* ed. 2, 1829, ii, p. 442, note.

Dicerobatis eregoodoo, *Cantor, Cat. Mal. Fish.* p. 438; *Day, Fish. India*, p. 744, pl. cxciii, fig. 1 (see synon.).

Eregoodoo tenkee, Tel.; *Shing pákat*, Maráthi; *Yeliki* or *Komun tirika*, Tam.

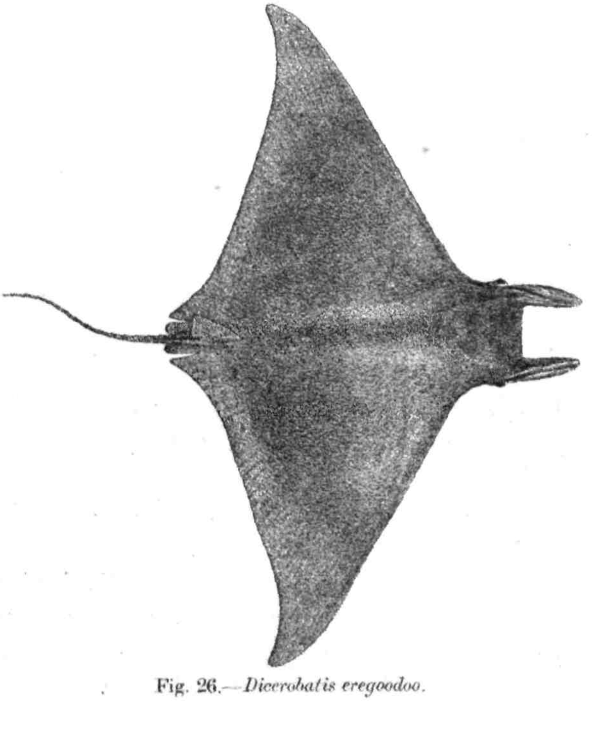

Fig. 26.—*Dicerobatis eregoodoo.*

Disk about twice as broad as long; tail in the young $1\frac{1}{2}$ times the length of the body, but in adults only a little more than half the same length. Body smooth. The horns or cephalic portion of the pectoral fin have a convoluted appearance, and "are used by the animal to draw its prey into its mouth, which opens like a huge cavern between them. The fishermen say they see them swimming slowly along with their mouth open and flapping these great sails inwards, drawing in the smaller crustacea on which they feed" (Sir W. Elliot, MS.). *Teeth*—small, like flattened, quadrangular tubercles as broad as wide in adults, twice as broad in the young, with a backwardly directed point; $\frac{340}{360}$, in a jaw twelve inches across the gape taken from an example upwards of eighteen feet across the disk, and $\frac{23}{28}$ vertical rows opposite the symphysis. In a pair of jaws four inches across, from an example captured at Kurrachee, there are $\frac{240}{244}$. Cantor found in an example thirty inches across the disk $\frac{80}{95}$, and six or seven vertical rows. It may therefore be supposed that the number increases with age, and perhaps alters in shape. The band of teeth reaches nearly to the angle of the mouth. *Fins*—no spine on the tail posterior to the dorsal fin. *Colour*—of a deep purplish superiorly; white beneath.

Hab. Seas of India to the Malay Archipelago; attaining to 18 feet and upwards across the disk.

69. (2.) **Dicerobatis kuhlii.**

Cephaloptera kuhlii, *Müller & Henle, Plagios.* p. 185, t. lix, fig. 1.
Dicerobatis kuhlii, *Day, Fish. India*, p. 745 (see synon.).

Disk more than twice as wide as long; tail not so long as the disk. Body and tail smooth. *Teeth*—wider than broad; $\frac{34-38}{34-38}$ series, the band ceasing some distance from the angle of the mouth. *Colour*—brown or greenish.

Hab. From the east coast of Africa, through the seas of India to the Malay Archipelago.

Subclass **TELEOSTEI.**

Skeleton osseous. Skull with cranial sutures. Vertebræ completely separated, and the posterior extremity of the vertebral column bony, or having bony plates. Branchiæ free, and the water discharged through a single aperture on each side, protected by a bony gill-cover or opercle; branchiostegal rays present. A non-contractile bulbus arteriosus, having a pair of valves at its commencement. Optic nerves decussating.

The fishes which compose this subclass form the great bulk of those existing at the present day, and are popularly known as the "true fishes." In geological sequence they appeared subsequently to the Chondropterygii, their first traces being found in the Cretaceous period towards the close of the Mesozoic epoch.

Synopsis of Orders amongst Indian Teleostei.*

All the fin-rays articulated, with the exception of the first in the dorsal and pectoral which sometimes are more or less ossified. Ventral fins, when present, abdominal and spineless. Air-bladder, if existing, having a pneumatic duct (except in *Scombresocidæ*) . 1. *PHYSOSTOMI.*

A portion of the dorsal, anal, and ventral fins unarticulated, forming spines †. Air-bladder, when present, completely closed in adults, not possessing a pneumatic duct.................. 2. *ACANTHOPTERYGII.*

All the rays of the vertical and ventral fins articulated; the latter, when present, being jugular and thoracic.................... 3. *ANACANTHINI.*

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* The above Orders are given in accordance with commonly received views or those of Müller somewhat modified; but they are of very different values, and must be largely altered when the developmental and general anatomy of fishes becomes better known.

† There are some genera in which the fins can hardly be said to possess any true spines, as amongst the *Trachinidæ*, *Aulostoma*, &c.

A dermal segmental skeleton; the opercular pieces reduced to a single plate. Gill-openings small. Gills consisting of small rounded tufts, attached to the branchial arches. Muscular system very slightly developed .... 4. *LOPHOBRANCHII.*

The bones of the head completely ossified, those in the remainder of the body incompletely. Vertebræ few. Gill-openings small, situated in front of the pectoral fins. Gills pectinate. Mouth narrow; the bones of the upper jaw mostly united, sometimes produced into the form of a beak. There may be a single soft-rayed dorsal fin, belonging to the caudal portion of the vertebral column, and situated opposite the anal; in some a rudimental spinous dorsal is also present: the ventrals, when existing, have the form of spines. Skin either smooth, with rough scales, or ossified in the form of plates or spines. Air-bladder destitute of a pneumatic duct .... 5. *PLECTOGNATHI.*

Order I. PHYSOSTOMI, Müller.

All the fin-rays articulated with the exception of the first in the dorsal and pectoral, which are frequently more or less ossified. Ventral fins, when present, abdominal and spineless. Air-vessel, if existing, having a pneumatic duct (except in the family *Scombresocidæ*).

This order contains the largest proportion of the freshwater fishes of India. The family *Siluridæ* or sheat-fishes are destitute of scales; the carps, *Cyprinidæ*, have scaled bodies but no teeth in the jaws; while the herrings, *Clupeidæ*, are likewise scaled, and have some teeth in the jaws and a carinate abdominal edge.

Synopsis of Indian Families.

I. Fishes with eel-like bodies. Margin of upper jaw formed of the premaxillaries, the maxillaries being internal and parallel to them. Vertical fins rudimentary, and no paired fins. Gill-openings in the form of a single slit. Scales, if present, minute. Accessory breathing-organs may be present. No air-bladder. Stomach without a blind sac; no pyloric cæca. Ovaries with oviducts. **Symbranchidæ.**

II. Fishes with eel-like bodies. Margin of upper jaw formed anteriorly by the premaxillaries and laterally by the maxillaries. Pectoral fins present or absent; no ventrals. No accessory breathing-organs. Stomach with a blind sac; no pyloric cæca. Ovaries without oviducts .. **Muræenidæ.**

III. Subopercle absent. Margin of upper jaw formed by the premaxillaries. Skin scaleless and smooth, or covered with osseous plates or scattered tubercles. Adipose dorsal usually present. **Siluridæ.**

IV. Pseudobranchiæ, when present, glandular. Margin of the upper jaw formed by the premaxillaries. Opercular pieces complete. Mouth toothless, teeth in lower pharyngeals. Head scaleless; body scaled or scaleless, never covered by osseous plates. Air-bladder present or absent. **Cyprinidæ.**

V. Pseudobranchiæ absent. Margin of upper jaw formed by the premaxillaries and maxillaries, which are toothed. Opercular pieces complete. No barbels. Dorsal fin in caudal portion of body. Stomach with blind sac; intestinal canal short, and furnished with spiral folds. No pyloric cæca. An air-bladder.......................... **Chirocentridæ.**

VI. Pseudobranchiæ usually well developed. Margin of the upper jaw formed by premaxillaries and maxillaries. Opercular pieces complete.

Abdomen usually keeled. No adipose dorsal. Scales on body, none on head. Pyloric appendages numerous .... **Clupeidæ.**

VII. No pseudobranchiæ. Margin of upper jaw mostly formed by premaxillaries, behind and parallel to which are the maxillaries. No scales or barbels. Abdomen rounded. Dorsal opposite anal. No adipose fin. Few pyloric cæca; large air-bladder. The ova fall into the abdominal cavity before exclusion .... **Galaxidæ.**

VIII. Pseudobranchiæ absent. Margin of upper jaw formed by premaxillaries and maxillaries. Opercular apparatus incomplete; a parieto-mastoid cavity on either side, leading into the interior of the skull. A single rayed dorsal fin; a long anal. Head and body scaled. Two pyloric appendages........................ **Notopteridæ.**

IX. Pseudobranchiæ well developed. Margin of upper jaw formed by premaxillaries. Opercular pieces sometimes incomplete. No barbels. Gill-openings very wide. Scales present or absent. Adipose dorsal present .... **Scopelidæ.**

X. Pseudobranchiæ absent. Margin of upper jaw formed by premaxillaries. Barbels absent. Teeth in both jaws, and in superior and inferior pharyngeals. One spineless dorsal in posterior half of body. Air-bladder simple............ **Cyprinodontidæ.**

XI. Pseudobranchiæ glandular. Margin of upper jaw formed by premaxillaries and maxillaries. Lower pharyngeals united. No adipose dorsal. Scales present. Air-bladder, when present, destitute of pneumatic duct..................... **Scombresocidæ.**

Family I. SYMBRANCHIDÆ.

Gill-openings confluent into a single slit, which is situated on the abdominal surface. Gills well developed or rudimentary. Body elongated. The humeral arch may or may not be attached to the skull. Margin of the upper jaw formed by the premaxillaries, the maxillaries being internal and parallel to them. Barbels absent. Palatine teeth, when present, in a single row or a narrow band. Vertical fins rudimentary, in the form of mere folds of skin, and no paired fins. Scales, if present, minute. Vent far behind the head. An accessory breathing-sac present or absent. Air-bladder absent. Ribs present. Stomach destitute of a blind sac. No pyloric appendages. Ovaries with oviducts.

The families *Symbranchidæ* and *Murænidæ* belong to the *Apodes* of many authors. The first is fairly represented in the fresh waters on the continent of India, whereas the latter is more numerous in

the seas than in the fresh waters. Among the Apodes the spined freshwater eels (*Rhynchobdellidæ*) and the *Notacanthidæ*, Günther, have been placed.

Geographical Distribution. Fresh and brackish waters of tropical Asia and America; also Western Australia and Van Diemen's land.

Synopsis of Indian Genera.

First group. AMPHIPNINA.

Humeral arch not attached to the skull; an accessory breathing-apparatus. Scales present.

Palatine teeth in a single row .... 1. AMPHIPNOUS.

Second group. SYMBRANCHINA.

Humeral arch attached to the skull. No accessory breathing-apparatus. Scales absent.

Gills rudimentary .... 2. MONOPTERUS.
Gills well developed .... 3. SYMBRANCHUS.

First group. AMPHIPNINA.

1. Genus **AMPHIPNOUS**, Müller.

Syn. *Pneumabranchus*, McClelland.

Branchiostegals six. Gill-membranes almost entirely grown to the isthmus, and having a single transverse opening. Three branchial arches with the laminæ rudimentary, divided by narrow slits. A respiratory air-sac exists on the neck behind the head and communicates with the gill-cavity. Palatine teeth in a single, well-developed row. Scales present and arranged in longitudinal rows.

This amphibious fish, when kept in an aquarium, may be observed constantly rising to the surface for the purpose of respiring atmospheric air direct. It usually remains with its snout close to the surface, and in like manner lies in the grassy sides of ponds and stagnant pieces of water, so that without trouble it may obtain access to air.

In *Amphipnous cuchia* we find that "of all the arches, the second alone possesses laminæ for the purposes of breathing; and these consist merely of a few long fibrils attached to the middle of the arch, and occupying but a very small extent of its surface; the third supports, in the place of laminæ, a thick and semi-transparent tissue, which in large individuals of the species possesses a fringed or denticulated appearance at its edge; whilst the first and fourth are bare, having only the membrane that fills up the space between

the arches reflected over them. The principal organs of respiration are two small bladders, which the animal has the power of filling with air, immediately derived from the atmosphere. They are placed behind the head, one on each side of the neck, above the superior or vertebral extremities of the branchial arches, and are covered over by the common integuments, presenting externally, when distended with air, two protuberances of a round shape. . . . They present, when separated from their surrounding attachments and inflated with air, thin, semi-transparent, membranous parietes, resembling the posterior portions of the lungs of serpents. . . . Of the whole volume of blood contained in the branchial artery, one-third passes through the gills and respiratory bladders, whilst the other two-thirds are conveyed directly from the heart to the aorta without being exposed to the action of the air."—*Taylor*, Gleanings in Science, ii, p. 173, and Edinb. Journ. of Sc. v, 1831, p. 33; *Hyrtl*, Denk. Ak. Wiss. Wien, 1858, xiv, p. 39, c. tab.

70. (1.) **Amphipnous cuchia.** (Fig. 27.)

Unibranchapertura cuchia, *Ham. Buch. Fish. Ganges*, pp. 16, 363 pl. 16, fig. 4.
Amphipnous cuchia, *Day, Fish. India*, p. 656, pl. clxvii, fig. 1 (see synon.).

Cuchia, Ooriah and Beng.; *Nga-sheen*, Burmese; *Dondoo paum*, Tel.

Length of head (from gill-opening) contained 6 to 8 times in the distance between the snout and the anus; length of tail 4 to $4\frac{1}{2}$ in the entire length. *Eyes*—two to three diameters from end of snout and situated in the anterior one fourth or one fifth of the length

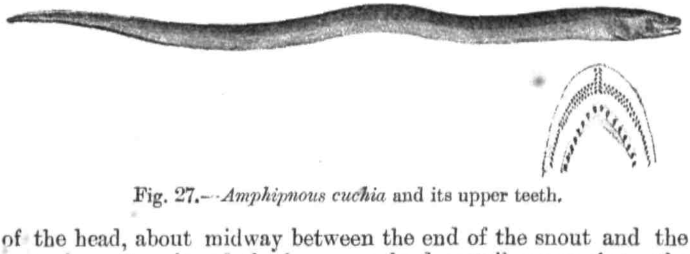

Fig. 27.—*Amphipnous cuchia* and its upper teeth.

of the head, about midway between the end of the snout and the posterior extremity of the jaws; a valved nostril opens above the orbit; a second, round and patent, in front of the snout. Upper jaw slightly the longer; lips fleshy. *Teeth*—a single row of small ones in the premaxillaries, except opposite the symphysis; a single band of large, curved, compressed and backwardly directed ones on either palatine; and a single row of moderately large ones on either ramus of the mandible. *Fins*—a rudimentary dorsal commences slightly before a vertical line drawn through the anus. *Scales*—distinct and longitudinally arranged. *Gill-*

openings—inferior, the membrane adherent to the isthmus. Vertebræ 106/65. *Colour*—greenish, or of a chestnut-brown, becoming lighter on the abdomen; numerous black spots over the body; occasionally individuals are flesh-coloured.

"Natives reject it as food and imagine that its bite is fatal to cattle, although less powerful on the human kind—a supposition highly improbable." (*Ham. Buch.*)

Hab. Fresh and brackish waters of the Punjab, Bengal, Orissa, Assam and Burma; attaining at least two feet in length.

Second group. SYMBRANCHINA.

2. Genus **MONOPTERUS**, Lacépède.

Syn. *Fluta*, Bl. Schn.; *Ophicardia*, McClelland; *Apterigia*, Basilewski.

Branchiostegals five or six. Gill-membranes almost entirely attached to the isthmus, having a single transverse opening. Three branchial arches separated by moderately wide intermediate slits, with the laminæ rudimentary or absent. Palatine teeth in a narrow band. Scales absent. No accessory breathing-sac.

Dareste observed a complete absence of branchial laminæ in three examples of *Monopterus javanensis*.

71. (1.) **Monopterus javanensis.** (Fig. 28.)

Monopterus javanensis, *Lacépède, H. N. Poiss.* ii, p. 139; *Day, Fish. India*, p. 656, pl. clxix, fig. 1 (see synon.).

Length of head contained 9 to 12 times in the distance between the end of the snout and the vent: length of body about four or five times that of the tail. *Eyes*—situated about midway between

Fig. 28.—*Monopterus javanensis* and upper teeth.

angle of mouth and end of snout, diameter one eighth of length of head, 2 diameters from end of snout and 1 to 1½ apart. Greatest diameter of fish at the occiput. Profile of upper surface of head descending somewhat suddenly from above the eyes to the snout, which last is pointed and somewhat compressed. Extent of cleft of mouth equal to about one third the distance between end of snout and gill-opening. Tail narrow and tapering to a point. *Teeth*—conical, and in a band tapering towards the angle of the mouth;

the palatine band resembles that in the jaw. *Fins*—dorsal commencing above or a little before the vertical from the vent. *Colour*—light greenish, with or without dark spots; or else the whole body nearly black.

"This eel is numerous at Chusan, in streamlets, canals, and estuaries. As it is a favourite article of food it is kept by the inhabitants of Chusan in large jars, with fresh water. But it is capable of living a considerable time out of water. It is of voracious habits, feeding on smaller fishes, and it takes hooks baited with earthworms." (*Cantor, l. c.*)

Hab. This fish is confined to the fresh or brackish waters of Burmah, the Malay Archipelago, and China.

3. Genus **SYMBRANCHUS**, Bloch.

Syn. *Unibranchapertura*, Lacépède; *Pneumabranchus* and *Ophisternon*, McClelland; *Tetrabranchus*, Bleeker.

Branchiostegals six. Gill-membranes not attached to the isthmus, having a single transverse opening. Four branchial arches with well-developed gills. Palatine teeth in a band. Scales absent. No accessory breathing-sac.

Geographical Distribution. Fresh and brackish waters of India to the Malay Archipelago and Australia: also tropical America.

72. (1.) **Symbranchus bengalensis.** (Fig. 29.)

Ophisternon bengalensis, *McClelland, Calc. Jour. N. H.* v, pp. 197, 220, pl. xi, figs. 1, 2.
Symbranchus bengalensis, *Day, Fish. India*, p. 657, pl. clxvii, fig. 2 (see synon.).

Length of head contained 9 to 12 times in the distance between end of snout and anus. *Eyes*—diameter about one twentieth of

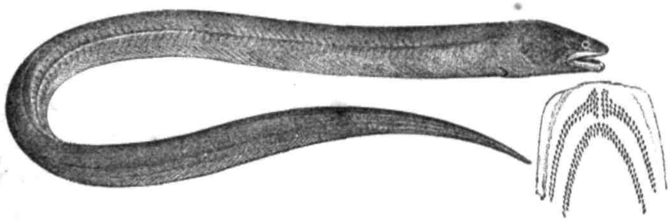

Fig. 29.—*Symbranchus bengalensis* and upper teeth.

length of head. The girth of the body is equal to about three times its height. Snout anteriorly rounded, lips fleshy, the upper jaw rather the longer; cleft of mouth extending to some distance behind the orbits. *Teeth*—in upper jaw fine and pointed, not continuous at the symphysis; those on either side terminating in

a triangular patch, with a narrow edentulous interspace; those in the lower jaw rather larger, with a narrow edentulous interspace between those of each side, laterally they are in a single row: palatine teeth in a band. *Fins*—the dorsal commences before the anal, which is situated in the last fourth or fifth of the total length, the caudal is hardly conspicuous: all the fins are low. *Lateral line*—conspicuous. *Colour*—a dull dirty brownish red in estuaries, lightest on the abdomen. In clearer water this fish is greenish or blackish green, the abdomen being paler.

Hab. Estuaries and fresh waters within the influence of the tides along the coasts of India and the Malay Archipelago, to the Philippines: attaining to several feet in length. Apparently more common in Bengal than in Malabar.

Family II. MURÆNIDÆ.

Body elongated, cylindrical, or band-shaped: the humeral arch not attached to the skull. The branchial openings in the pharynx may be narrow or wide slits. Margin of upper jaw constituted anteriorly by the premaxillaries, which are more or less coalescent with the vomer and ethmoid, while the sides of the upper jaw are formed by the maxillaries, which are furnished with teeth. Vertical fins, when present, confluent or separated by a projecting tail: pectorals present or absent: ventrals absent. Scales, when present, rudimentary. The vent may be situated close to the root of the pectoral fins, or a long distance posterior to the head. The heart may be situated just, or a long distance, behind the gills. Stomach with a blind sac. No pyloric appendages. Ovaries destitute of oviducts.

Eels (*Anguilla*) are not, as sometimes supposed, hermaphrodites, but they breed in salt water. Large sterile females are found in rivers.

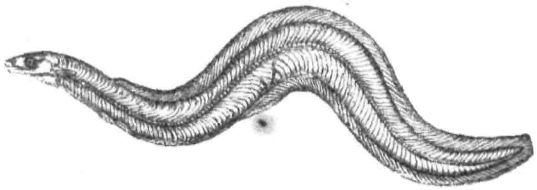

Fig. 30.—The above figure, from Sir W. Elliot's drawing, is a common *Leptocephalus* of some murænoid form.

A number of larval fishes have been termed *Leptocephali*, or "glass eels" (fig. 30). The development of some of them, it has been suggested, may have been arrested at an early age, the fishes dying before attaining their perfect state. *L. spallanzanii* is said by Dareste to be a young conger: and Delage in 1886 (Compt. Rend.

ciii, p. 698) traced the development of one of these fishes into a conger; but some cannot be the offspring of murænoid fishes. "*Stomiasunculus*, Kaup, is the young of *Stomias; Porobronchus*, Kaup, the young of *Fierasfer acus*; and *Esunculus*, Kaup, probably that of *Alepocephalus*." (*Günther*.)

Eels are generally known as *Velangoo* or *Pamboo meen* in Tamil (snake fish).

Synopsis of Indian Genera.

First group. MURÆNIDÆ ENGYSCHISTÆ.

A. Branchial openings in the pharynx are narrow slits.

Pectorals absent; vertical fins well developed. Posterior nostril a round and patent opening	1. MURÆNA.
Fins absent, except a rudimentary one round end of tail	2. GYMNOMURÆNA.

Second group. MURÆNIDÆ PLATYSCHISTÆ.

B. Branchial openings in the pharynx are wide slits.

a. Heart close behind gills. Tail longer or scarcely shorter than the trunk. Nostrils lateral or superior. Tongue free. Caudal fin continued round the end of tail; pectorals present or absent. Scales present or absent.

Pectoral fins present; dorsal commences some distance behind the nape. Rudimentary scales	3. ANGUILLA.
Pectoral fins present; dorsal commences above gill-opening. Cleft of mouth reaches to below middle of eye. Large muciferous cavities on skull. Teeth in bands. Scaleless	4. CONGROMURÆNA.
Pectoral fins present; dorsal commences above gill-opening. Cleft of mouth reaches to behind middle of eye. Maxillary teeth biserial; vomerine uniserial. Scaleless	5. UROCONGER.

b. Heart close to gills. Tail not shorter than trunk. Nostrils lateral or superior. Tongue not free. Caudal fin continued round the end of tail; pectorals present or absent. Scaleless.

Pectoral fins present. Canine teeth in jaws anteriorly; strong teeth on vomer. Posterior nostril opposite upper part or middle of eye	6. MURÆNESOX.
Pectoral fins absent. Posterior nostril lateral and in front of orbit	7. SAURENCHELYS.

c. Heart close to gills. Nostrils labial. Tongue not free. Caudal fin continued round the end of tail; pectorals present or absent. Scaleless.

Pectoral fins absent. Body elongated, vermiform	8. MURÆNICHTHYS.

d. Heart close to gills. Nostrils labial. Tongue not free. End of tail free, being without fin-rays. Pectorals, when present, rudimentary. Scaleless.	
Vomerine teeth present	9. OPHICHTHYS.
e. Heart placed a long distance behind the gills. Tail shorter than the trunk. Posterior nostril in front of the eye. Vertical fins little developed; pectorals, if present, rudimentary.	
Eyes small. Cleft of mouth narrow. Teeth in a single row....	10. MORINGUA.

First group. MURÆNIDÆ ENGYSCHISTÆ.

1. Genus **MURÆNA**, Artedi.

Syn. *Gymnothorax*, Bloch; *Murænophis*, Lacép.; *Echidna*, Forst.; *Thærodontis*, *Strophidon*, and *Lycodontis*, McClell.; *Sidera*, *Eurymyctera*, *Thyrsoidea*, *Limamuræna*, *Polyuranodon*, *Pæcilophis*, *Gymnomuræna*, *Priodonophis*, and *Tæniophis*, Kaup; *Pseudomuræna*, Johnson.

Body moderately or exceedingly elongate. Gill-openings narrow. A tubular nostril on either side of the upper surface of the snout; the posterior nostril a round foramen between the eyes or opposite the antero-superior edge of the eye, it may or may not be furnished with a tube. Teeth well developed and acute or molariform; the maxillary teeth may be in one or two rows. Dorsal fin elevated or not so; the end of the tail surrounded by fin, which is occasionally rudimentary. Pectorals absent.

Geographical Distribution. Seas of tropical and temperate regions: a few species ascend tidal rivers.

The dentition in some of these fishes alters considerably with age, whilst in others it is not constant in every individual of the same species.

Synopsis of Indian Species.

A. Teeth pointed. The posterior nostrils not tubular.	
a. Tail and trunk of about the same length.	
Teeth biserial. Black, with numerous yellow dots	1. *M. meleagris*, p. 76.
Teeth biserial. Brownish yellow, with fine white spots, streaks, or marks, which may be lost in the adult	2. *M. tile*, p. 76.
Teeth biserial. Greenish olive, with silvery dots along the lateral line	3. *M. sathete*, p. 77.
Teeth uniserial. Dark purplish, covered with fine white spots	4. *M. punctata*, p. 77.
Teeth uniserial. Yellow, with 18 to 20 dark bands, 3 of which are on the head	5. *M. rueppellii*, p. 77.

Teeth uniserial. About 16 dark bands encircle body, none being on the head.. 6. *M. reticularis*, p. 78.
Teeth uniserial. From 28 to 35 more or less complete dark bands; head with dark marks .... 7. *M. punctatofasciata*, [p. 78.
Teeth uniserial. Dark spots on head, body, and fins, separated by narrow light lines or interspaces............ 8. *M. tessellata*, p. 78.
Teeth uniserial. Olive-brown; a few dark spots on head, and many irregular spots on body and fins .... 9. *M. fimbriata*, p. 79.
Teeth uniserial. Brown, covered with fine spots on head and body, amongst which are reticulated yellow lines; a black spot usually at the gill-opening .... 10. *M. pseudothyrsoidea*, [p. 79.
Teeth uniserial. Light brown, covered with irregular dark blotches and usually reticulated lines, most distinct in the posterior half of the body .... 11. *M. undulata*, p. 80.
Teeth uniserial; vomerine band bifurcated in front. Light brown, marbled with darker; gill-opening in a black spot; fins usually with a light outer edge .... 12. *M. flavimarginata*, [p. 80.
Teeth uniserial. Brownish black or blotched .... 13. *M. afra*, p. 80.

b. Tail at least twice as long as trunk.

Teeth biserial. Uniform brown; the fins nearly black .... 14. *M. macrura*, p. 81.

3. Teeth in jaws pointed; globular on vomer.

Teeth biserial. Light brown, covered with closely-set purplish spots and light intermediate lines forming a network; anal fin sometimes with a light outer edge .... 15. *M. thyrsoidea*, p. 81.
Teeth in jaws uniserial. Grey, with arborescent black markings and marbling .... 16. *M. picta*, p. 82.

C. Teeth generally obtuse or molariform.

Tail one third of the total length. Brown, with from 30 to 100 narrow white or yellow rings .... 17. *M. zebra*, p. 82.
Tail a little shorter than the trunk. Brown, with from 20 to 25 dark blotches along the side, with some white spots in the centre of each .... 18. *M. nebulosa*, p. 83.
Tail one third longer than the trunk. Brown, with from 25 to 30 narrow, yellow, whole or half bands .... 19. *M. polyzona*, p. 83.
Tail about as long as trunk. Black .... 20. *M. nigra*, p. 84

73. (1.) Muræna meleagris.

Muræna meleagris, *Shaw, Nat. Misc.* p. 220, *and General Zool.* iv, pt. i, p. 32; *Day, Fish. India,* p. 668 (see synon.).

Length of head contained $3\frac{1}{3}$ to $3\frac{2}{3}$ times in the distance between the end of the snout and the vent; tail rather longer than the trunk. *Eyes*—small, $2\frac{1}{4}$ diameters from the end of the snout; anterior nasal tubes very short. Length of cleft of mouth $2\frac{2}{3}$ in the length of the head. The mouth can be completely closed. Gill-opening narrow. *Teeth*—in two rows, except on the vomer and on the sides of the mandible. Canines rather small. *Colour*—brownish black, covered with numerous yellow dots that are smaller than the eye.

Hab. From the east coast of Africa, the Seychelles, and the Mauritius throughout the seas of India to the Malay Archipelago and the Pacific. This species attains a large size.

74. (2.) Muræna tile. (Fig. 31.)

Murænophis tile, *Ham. Buch. Fish. Ganges,* pp. 18, 363.
Muræna tile, *Day, Fish. India,* p. 668, pl. clxx, fig. 4 (see synon.).

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$ in the distance between the end of the snout and the vent; tail rather shorter than the trunk, or about the same length. *Eyes*—rather small, about 2 to $2\frac{1}{2}$ diameters from

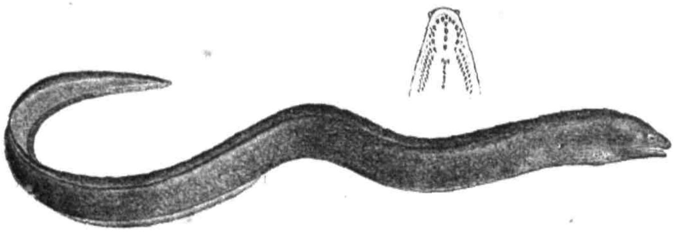

Fig. 31.—*Muræna tile* and upper teeth.

end of snout and situated slightly nearer to the angle of the mouth than to the end of the snout; length of cleft of mouth about $3\frac{1}{3}$ in that of the head; anterior nasal tubes short. Gill-opening about as wide as the eye. *Teeth*—in two rows, except at the sides in the lower jaw; canines small. *Colour*—brownish yellow or greenish, becoming lighter beneath; the body covered with small white spots, specks, or marks, which sometimes have a dark border, or they may be entirely absent in adults.

Hab. Bourbon, seas and estuaries of Bengal to the Malay Archipelago. *M. tile* ascends tidal rivers and is common in the Hooghly at Calcutta, where it attains about 2 feet in length.

75. (3.) Muræna sathete.

Murænophis sathete, *Ham. Buch. Fish. Ganges*, pp. 17, 363.
Muræna sathete, *Day, Fish. India*, p. 668 (see synon.).

Length of head $4\frac{1}{4}$ to 5 in the distance between the end of the snout and the vent; tail rather longer (considerably according to McClelland) than the trunk. *Eyes*—small, $2\frac{1}{4}$ to $2\frac{1}{2}$ diameters from the end of the snout, 2 apart, and midway between the angle of the mouth and the end of the snout. Length of the cleft of the mouth about $3\frac{2}{3}$ times in the length of the head; jaws nearly equal in length anteriorly. *Teeth*—the maxillary, anterior vomerine, and anterior mandibular teeth biserial, the rest uniserial. *Colour*—Head, body, and fins dark greenish olive, becoming of a greenish yellow inferiorly; silvery dots along the lateral line.

Hab. Bay of Bengal, Pinang.

76. (4.) Muræna punctata.

Gymnothorax punctatus, *Bl. Schn. Syst. Ich.* p. 526.
Muræna punctata, *Day, Fish. India*, p. 669, pl. clxxiii, fig. 1 (see synon.).
Calamaia paum, Tel.

Length of head $3\frac{1}{3}$ in the distance between the end of the snout and the vent; tail rather longer than the trunk. *Eyes* of moderate size, situated midway between the angle of the mouth and end of the snout; anterior nasal tubes about half as long as the orbit. Length of cleft of mouth equal to half the length of the head; the mouth can be completely closed. Gill-opening about twice as large as the orbit. *Teeth*—in a single row, from 18 to 22 on each side of the mandible, the anterior longest. Canines of moderate size. *Colour*—purplish black, with black streaks radiating from the eye; the whole of the fish covered with pure white spots each having a dark edge, they are largest posteriorly, but nowhere exceed the size of the pupil of the eye.

Hab. Coromandel coast of India. This fish attains to a large size. Russell observed that it was not eaten, and it was considered to be of a poisonous nature, whilst its flesh smelt very rank even when it was just captured.

77. (5.) Muræna rueppellii.

Dalophis rüpelliæ, *McClelland, Cal. Journ. Nat. Hist.* v, p. 213.
Muræna ruppellii, *Day, Fish. India*, p. 669 (see synon.).

Length of head $3\frac{1}{3}$ to $3\frac{2}{3}$ in the distance between the end of the snout and the vent; tail about one fifth longer than the trunk. *Eyes*—rather above half the length of the snout, and situated nearly midway between angle of mouth and end of snout; anterior nasal tubes scarcely half the length of the eye. Snout slightly compressed; extent of cleft of mouth $2\frac{2}{3}$ in the length of the head. Gill-opening about as wide as the eye. *Teeth*—in a single row (the young may have one or two extra teeth forming an inner maxillary row), from 20 to 23 in each ramus of mandible; canines

of moderate size; the mouth can be completely closed. *Colour*—yellowish, with from 18 to 20 black rings encircling the head and body; they are narrower than the ground-colour; the first three are on the head, the others sometimes become less distinct as age increases.

Hab. Andamans and Malay Archipelago.

78. (6.) **Muræna reticularis.**

Gymnothorax reticularis, *Bloch, Ausl. Fische*, t. 416.
Muræna reticularis, *Day, Fish. India*, p. 669 (see synon.).

Length of head $3\frac{1}{3}$ in the distance between the end of the snout and the vent; tail a little longer than the trunk. *Eyes*—diameter two thirds of the length of the snout, situated rather nearer angle of mouth than end of snout. Anterior nasal tubes very short; snout short and very slightly compressed. Extent of cleft of mouth one third of the length of the head. Gill-opening of about the same size as the eye. *Teeth*—in a single row, some being slightly serrated; about 13 in each ramus of mandible; the canines small; the mouth can be completely closed. *Colour*—head and back spotted and dotted with brown; about 16 dark cross bands on the body, wider than the ground-colour, and most distinct in the lower half of the body and on the dorsal fin; the first well-marked ventral band is behind the gill-opening.

Hab. Seas of India to China and Japan.

79. (7.) **Muræna punctatofasciata.**

Gymnothorax punctato-fasciatus, *Bleeker, Gymnoth. Ind. Arch.* p. 167, *and Atl. Ich.* iv, p. 99, pl. clxxv, fig. 4.
Muræna punctato-fasciata, *Day, Fish. India*, p. 669, pl. clxix, fig. 4 (see synon.).

Kilis, Maráthi.

Length of head $3\frac{3}{4}$ to $4\frac{1}{4}$ in the distance between the end of the snout and the vent; tail slightly longer than the trunk. *Eyes*—situated midway between the end of the narrow snout and the angle of the mouth, two thirds the length of the snout. The mouth can be completely closed; the extent of its cleft equals one third of the length of the head. Gill-opening about the same size as the eye. Body rather slender. *Teeth*—pointed and in a single row, without any basal lobe, occasionally there are 2 or 3 teeth forming an inner maxillary row; canines of moderate size; 16 to 17 teeth on each side of the mandible. *Colour*—reddish brown, darkest along the back; from 28 to 35 dark, more or less complete, rings of an irregular character on the body and fins. Head and ground-colour between the rings with blotches, spots, and fine lines.

Hab. Seas of India to the Malay Archipelago.

80. (8.) **Muræna tessellata.**

Muræna tessellata, *Richardson, Voy. Sulphur, Ich.* p. 109, t. lv, figs. 5-8; *Day, Fish. India*, p. 670, pl. clxxi, fig. 4 (see synon.).

Kyouk nga phayoon, Arracan.

Length of head to gill-opening 3 to $3\frac{2}{3}$ in the distance between the end of the smout and the vent; tail slightly longer or shorter than the trunk. Snout compressed. *Eyes*—situated slightly before the middle of the distance between the angle of the mouth and the end of the snout. Length of cleft of mouth $2\frac{1}{3}$ to $2\frac{1}{2}$ in the distance between the end of the snout and the gill-opening. Anterior nasal tubes half as long as eye. *Teeth*—large, compressed, pointed, and in the adult in a single row: occasionally in the young there is a short internal row in the maxilla. *Fins*—dorsal commences above the gill-opening. *Colour*—dark polygonal or rounded spots, which are separated by narrow light lines or interspaces on the head, body, and fins; most or all of the spots are wider than the intervening areas.

Hab. From the east coast of Africa and the Mauritius, through the seas of India to the Malay Archipelago, and China.

81. (9.) Muræna fimbriata.

Muræna fimbriata, *Bennett, P. Z. S.* 1831, p. 168; *Day, Fish. India*, p. 670, pl. clxxii, fig. 1 (see synon.).

Chuka pám, Tel.

Length of head 3 to $3\frac{1}{4}$ in the distance between the end of the snout and the vent; tail one third longer than the trunk. *Eye*—rather nearer the angle of the mouth than the end of the narrow snout, from which last it is distant from $1\frac{2}{3}$ to 2 diameters. Extent of cleft of mouth equal to one third of the length of the head. Gill-opening smaller than the eye. *Teeth*—pointed, and in a single row, without any basal lobe, occasionally there are 2 or 3 teeth in a second inner maxillary row. *Colour*—olive-brown, with a few black spots on the head, and numerous irregularly formed ones on the body, dorsal and anal fins; many of the spots take a vertical direction, and a few are larger than the eye. Fins with a white edge. In some examples the spots are in 2 or 3 regular longitudinal rows.

Hab. Madagascar, Coromandel Coast of India, Andaman Islands to the Malay Archipelago.

82. (10.) Muræna pseudothyrsoidea.

Muræna pseudothyrsoidea, *Bleeker, Batavia, Nat. Tijdschr.* iii, p. 778, *and Muræn.* p. 44; *Day, Fish. India*, p. 670, pl. clxxiii, fig. 3 (see synon.).

Hesál, Maráthi.

Length of head $3\frac{1}{2}$ to $3\frac{3}{5}$ in the distance between the end of the snout and the vent; tail a little shorter than the trunk. *Eyes*—nearer end of snout than angle of mouth, $1\frac{2}{3}$ to 2 diameters in the length of the snout, and $1\frac{1}{3}$ apart. Cleft of mouth $2\frac{1}{4}$ in the length of the head. The gill-opening about one third wider than the eye. *Teeth*—in a single row, about 18 or 20 on each side of the mandible, the 2 anterior being canines and of moderate size; one or two teeth of anterior vomerine series subulate and

larger than those in the premaxillaries. The mouth can be completely shut. *Colour*—brownish, covered with fine dark spots on the head and body, intermixed with reticulated yellow lines, most distinct in the caudal region. Sometimes a white edge to fins. Gill-opening usually surrounded by a black spot.

Hab. Coasts of Sind and India to the Malay Archipelago.

83. (11.) Muræna undulata.

Murænophis undulata, *Lacépède, H. N. Poiss.* v, pp. 629, 644.
Muræna undulata, *Day, Fish. India*, p. 671, pl. clxxi, fig. 5 (young), & pl. clxxiii, fig. 2 (adult) (see synon.).

Length of head $3\frac{1}{4}$ to $3\frac{1}{3}$ in the distance between the end of the snout and the vent; tail a little longer than the trunk. *Eyes*—$1\frac{3}{4}$ to 2 diameters from the end of the snout, and about midway between the angle of the mouth and the end of the snout. Length of cleft of mouth $2\frac{1}{3}$ to $2\frac{1}{2}$ in the length of the head. Gill-opening about as wide as the eye. Anterior nasal tube short. The mouth cannot be completely shut; snout pointed. *Teeth*—in a single row, occasionally one or two additional, forming an inner row in the maxilla; normally 4 pairs of canines in the mandibles, and 18 to 20 teeth in either ramus of mandible; two canines in the maxilla. *Colour*—light brownish, covered with irregularly sized blotches, and usually with light reticulated lines over the body, most distinct posteriorly; no black spot at gill-opening; no white edge to fins.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and Pacific Ocean.

84. (12.) Muræna flavimarginata.

Muræna flavimarginata, *Rüppell, Atl.* p. 119, pl. xxx, fig. 3; *Day, Fish. India*, p. 671 (see synon.).

Length of head $3\frac{2}{3}$ to 4 in the distance between the end of the snout and the vent: tail rather shorter than the trunk. *Eyes*—small, from 2 to $2\frac{1}{2}$ diameters in the length of the snout, and situated about midway between the angle of the mouth and the end of the snout. Anterior nasal tubes very short: snout rather elevated. Length of cleft of mouth $2\frac{1}{2}$ in the length of the head. The mouth can be completely closed. Gill-opening wider than the eye. *Teeth*—in a single row, except the vomerine band, which is bifurcated anteriorly; canines of moderate size. *Colour*—light brown or yellowish brown, marbled or spotted with darker; the head and end of tail nearly black. Gill-opening in a black spot. Fins usually with a light edge.

Hab. Red Sea, Seychelles Archipelago, Bourbon, Mauritius, and seas of India to the Malay Archipelago.

85. (13.) Muræna afra.

Gymnothorax afer, *Bloch, Ausl. Fische*, t. 417.
Muræna afra, *Day, Fish. India*, p. 671 (see synon.).

Length of head 3¾ in the distance between the end of the snout and the vent; tail slightly longer than the trunk. *Eyes*—diameter about half the length of the snout; situated slightly nearer to angle of mouth than to end of snout. Length of cleft of mouth about 2¾ in the length of the head. Snout pointed; anterior nasal tubes about half as long as the orbit. Gill-opening not quite so wide as the eye. *Teeth*—in old examples in one row, but in the young usually in two rows in both jaws. *Colour*—a light ground, blotched and marked all over with brown, or of a general brownish black.

Hab. Recorded from Tranquebar (Bl. Schn.), Indian Ocean, Australia, and tropical parts of the Atlantic.

86. (14.) **Muræna macrura.** (Fig. 32.)

Muræna macrurus, *Bleeker, Batavia, Nat. Tijdsch.* vii, p. 324; *Day, Fish. India,* p. 672, pl. clxx, fig. 5 (see synon.).

Seram pambu, Tamil.

Length of head from snout to gill-opening one fourth of the distance between the end of the snout and the vent; tail from 1¾ to twice as long as the trunk. *Eyes*—situated in the front half of

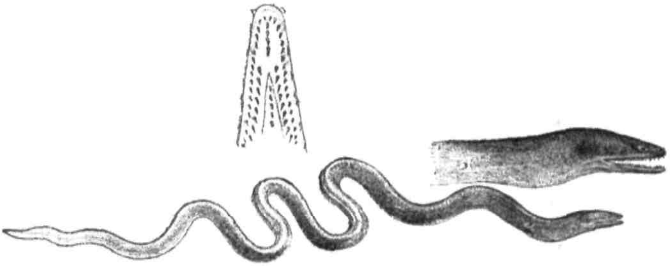

Fig. 32.—*Muræna macrura* and upper teeth.

the distance between the angle of the mouth and the end of the snout, about 2 diameters from end of snout. *Teeth*—pointed, those in the maxilla and mandible in two rows; canines badly developed. *Fins*—the dorsal anteriorly is low and densely enveloped in skin; it commences midway between the gape of the mouth and the gill-opening. *Colour*—uniform brown, the fins tinged with black.

The variety *longissima*, Kaup, has the body comparatively longer than in *macrura*.

Hab. Seas of India to the Malay Archipelago. It attains upwards of 10 feet in length.

87. (15.) **Muræna thyrsoidea.**

Muræna thyrsoidea, *Richardson, Voy. Sulphur, Ich.* p. 111, pl. xlcx, fig. 1; *Day, Fish. India,* p. 672, pl. clxxii, fig. 3 (see synon.).

Length of head $3\frac{1}{2}$ in the distance between the end of the snout and the vent; tail from one sixth to one third longer than the trunk. *Eyes*—$1\frac{1}{3}$ diameters from end of snout, to which they are nearer than to the angle of the mouth. Anterior nasal tubes equal in length to two thirds of the vertical diameter of the eye. Length of cleft of mouth $3\frac{1}{3}$ in the length of the head. Gill-openings rather larger than the eye. *Teeth*—conical and laterally biserial on the maxilla; about 23 on each ramus of the mandible; vomerine teeth globular and in two rows; no large canines; the mouth cannot be completely shut. *Fins*—dorsal more than two thirds as high as the body. *Colour*—light brown, covered all over with closely-set purplish spots, amongst which are light lines forming a network; gill-opening sometimes with a black mark around it; no white edge to fins.

Hab. Andamans and Burma to the Malay Archipelago, China and the Tonga Islands.

88. (16.) **Muræna picta.**

Muræna picta, *Ahl, De Mur. et Ophich. in Thunb. Diss.* iii, p. 6, t. ii, fig. 2; *Day, Fish. India*, p. 672, pl. clxxii, fig. 4 (see synon.).

Length of head $3\frac{2}{3}$ in the distance between the end of the snout and the vent; tail about as long as the trunk. *Eyes*—small, about 2 diameters from the end of the snout, and situated over about the centre of the cleft of mouth, which latter is about one third of the length of the head: the mouth cannot be completely closed. Anterior nasal tube not quite so long as the vertical diameter of the orbit. Gill-opening about as large as the orbit. *Teeth*—maxillary and premaxillary teeth in a single row; vomerine ones posteriorly rounded and generally anteriorly bifurcated in a row; the anterior 2 or 3 vomerine teeth are rather curved, sharp, not subulate, and about the same size as those in the premaxillaries. Mandibular teeth in one row, except anteriorly where it is double. *Colour*—there are many different forms of colour, usually the ground tint is grey or greyish yellow covered with black spots, which are connected together by a network of dark lines, causing the fish to appear marbled.

Hab. East coast of Africa, Madagascar, Bourbon, and seas of India to the Malay Archipelago and beyond.

89. (17.) **Muræna zebra.**

Gymnomuræna zebra, *Shaw, Gen. Zool.* iv, p. 31.
Muræna zebra, *Day, Fish. India*, p. 673 (see synon.).

Length of head $6\frac{1}{2}$ to $7\frac{1}{2}$ in the distance between the end of the snout and the vent; tail one third of the total length. *Eyes*—small, and rather nearer the end of the snout than to the angle of the mouth. *Teeth*—consist of bands of obtuse molars. *Colour*—rich dark brown, ornamented with from 30 to 100 narrow white or yellow rings, which are sometimes incomplete.

Hab. Red Sea and east coast of Africa, through the seas of India to the Malay Archipelago and the Pacific. This species attains a large size.

90. (18.) Muræna nebulosa. (Fig. 33.)

Muræna nebulosa, *Ahl, De Mur. et Ophich.* p. 5, t. i, fig. 2; *Day, Fish. India*, p. 673, pl. clxxii, fig. 2 (see synon.).

Saulinga Pám, Tel.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$ in the distance between the end of the snout and the vent; tail a little shorter than the trunk. *Eyes*—nearly 2 diameters from end of snout and situated midway between it and cleft of mouth, which last equals about one third of the length of the head. Gill-opening rather smaller than the eye. *Teeth*—most of the teeth obtuse or molariform. *Fins*—vertical ones rather well developed and commencing a little in front of gill-opening. *Colour*—brownish or olive, darkest along the back. A

Fig. 33.—*Muræna nebulosa* and upper teeth.

row of from 20 to 25 black blotches along the upper surface of the head and back extending on to the dorsal fin, and nearly as wide as the ground-colour; there are some white spots in the centre of each. A similar row of blotches along the abdominal surface. Intermediate ground-colour of fish covered with small black stars, spots, or vermiculated lines. Vertebræ 65/57.

Hab. Red Sea, Madagascar, Bourbon, Seychelles Archipelago, through the Indian and Pacific Oceans. It is said to attain 5 feet in length.

91. (19.) Muræna polyzona.

Muræna polyzona, *Richardson, Voy. Sulphur, Ich.* p. 112, pl. lv, figs. 11–14; *Day, Fish. India*, p. 673, pl. clxix, fig. 5 (erroneously marked *M. schultzei*) (see synon.).

Búdidé pám, Tam.

Length of head one fourth of the distance between the end of the snout and the vent; tail about one third longer than body. *Eyes*—of moderate size, placed about midway between angle of mouth and end of the snout. Length of cleft of mouth $3\frac{1}{2}$ in the length of the head. Gill-opening small, scarcely so large as the eye. *Teeth*—with rounded crowns, their form changing considerably with

age. *Fins*—dorsal rudimentary, commencing a little behind the vertical from the branchial opening. *Colour*—deep brown, encircled with 25–30 fine narrow (yellow) whole or half bands, which usually increase in width as they descend.

Hab. Red Sea, through the seas of India to the Malay Archipelago and the Pacific.

92. (20.) **Muræna nigra.**

Muræna nigra, *Day, P. Z. S.* 1870, p. 702, *and Fish. India,* p. 674, pl. clxxi, fig. 3.

Length of head $4\frac{1}{2}$ in the distance between the end of the snout and the vent; tail nearly one half of the total length. *Eyes*—situated nearer to the snout than to the angle of the mouth, small, diameter half that of the snout; anterior tubular nostril of moderate length. Gill-opening about as wide as the eye. Cleft of mouth equals one third of length of the head; the mouth cannot be completely closed. *Teeth*—biserial, except in the mandible, where there are three rows in some places; all are obtuse except those of the inner maxillary row, which are pointed and finer than the outer row; premaxillary and vomerine teeth of equal size and with globular heads; mandible with about 20 teeth on each side. *Fins*—dorsal and anal moderately developed; the former commencing just behind a vertical line from the gill-opening, and half as high as the body. *Colour*—uniform black, no light edge to the fins.

Hab. Andamans. The specimen, 16 inches long, was discovered alive under a large stone at low water at Port Blair.

2. Genus **GYMNOMURÆNA**, Lacépède.

Syn. *Murænoblenna,* Lacép.; *Ichthyophis,* Lesson; *Uropterygius* Rüpp.; *Channomuræna,* Richardson.

Gill-openings of moderate width or narrow. Two pairs of nostrils on the upper surface of the snout, the posterior being a round foramen, or with a short tube. Teeth small, pointed, and numerous. Fins absent, except a rudimentary one round the end of the tail. Scales absent.

Geographical Distribution. Indian and Pacific Oceans.

Synopsis of Indian Species.

Tail nearly twice as long as trunk. Brownish, with dark blotches	1. *G. tigrina,* p. 84.
Tail rather longer than trunk. Grey, marbled with arborescent dark lines	2. *G. marmorata,* p. 85.

93. (1.) **Gymnomuræa tigrina.**

Ichthyophis tigrinus, *Lesson, Mém. Soc. d'Hist. Nat. Paris,* iv, p. 399.

Gymnomuræna tigrina, *Day, Fish. India,* p. 674 (see synon.).

Length of head $4\frac{1}{4}$ in the distance between the end of the snout and the vent; tail nearly twice as long as the body. *Eyes*—small. Posterior nostril slightly tubular in the adult. Extent of cleft of mouth $2\frac{1}{2}$ in the length of the head. *Teeth*—no distinct canines; the maxillary and anterior mandibular teeth in two rows. *Colour*—brownish, with various sized irregularly shaped or rounded black spots and blotches.

Hab. East coast of Africa, seas of India to the Malay Archipelago and beyond. An example in the British Museum from the Mauritius is 4 feet in length.

94. (2.) **Gymnomuræna marmorata.** (Fig. 34.)

Gymnomuræna marmorata, *Lacépède, H. N. Poiss.* v, pp. 648, 650; *Day, Fish. India*, p. 674, pl. clxxii, fig. 5 (see synon.).

Length of head 4 to $4\frac{1}{2}$ in the distance between the end of the snout and the vent; tail rather longer than the trunk. *Eyes*—small, about $1\frac{1}{2}$ or $1\frac{2}{3}$ diameters from the end of the snout, to

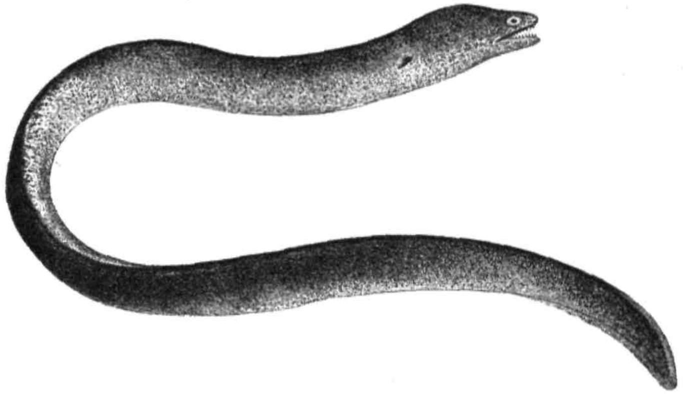

Fig. 34.—*Gymnomuræna marmorata.*

which they are nearer than to the angle of the mouth. Extent of cleft of mouth from $2\frac{1}{2}$ to $2\frac{3}{4}$ in the length of the head. The gill-opening wider than the eye. Anterior nasal tubes short, the posterior nostrils with a raised edge in adults. *Teeth*—pointed, in a band in each jaw, the inner row the larger; no large canines; in a single row in the vomer, the anterior two rather enlarged and acicular. *Fins*—the vertical fins only exist round the end of the tail, the fin-rays being rudimentary. *Colour*—brownish grey, marbled all over with arborescent dark lines. The variety *G. xanthopterus* has the fins yellow.

Hab. Andamans to the Malay Archipelago.

Second group. MURÆNIDÆ PLATYSCHISTÆ.

3. Genus **ANGUILLA**, Cuvier.

Syn. *Muræna* (sp.), Artedi; *Terpolepis* (pt.), McClelland; *Paranguilla*, Bleeker.

Gill-openings of moderate extent, situated near the base of the pectoral fins. Upper jaw not projecting beyond the lower. Teeth small and in bands. The dorsal fin commences at some distance behind the nape; pectorals present. Small scales present, which are imbedded in the skin.

Geographical Distribution. Fishes of this genus appear to be distributed in fresh waters throughout the habitable globe, being reputed to be only absent in the Arctic regions, and probably in cold districts such as Turkestan.

Numerous species have been recorded and more are almost yearly being added to the present mass of synonyms. There appear to be two distinct forms in India, but they are subject to variation in the relative position of the origin of the dorsal fin to the vent; and likewise, but to a minor extent, in the character of the bands of teeth and the position of the eye. The comparative size of the bodies of these fish also varies with age and the existence of suitable food in the localities they inhabit.

Eels attain a large size in India, but not the immense length (300 feet) attributed to those of the Ganges by Pliny. Being seldom eaten except by the lower classes, there is but little demand for them. "The natives have an easy way of taking them. They leave small-mouthed earthen pots with a bit of sheepskin in each over night, and draw them up in the morning, with their fish lying coiled up most comfortably in them" (Thomas, 'Tank Angling in India,' p. 100). In Java the eel, according to Bleeker, is considered by the natives to be a serpent, and they say it attacks small goats and even children. It migrates overland from one river to another when desirous of change.

Synopsis of Indian Species.

Origin of dorsal fin situated about midway between the gill-opening and origin of anal fin	1. *A. bengalensis*, p. 86.
Origin of dorsal fin situated above, rather in front of, or slightly behind the vent	2. *A. bicolor*, p. 87.

95. (1.) Anguilla bengalensis. (Fig. 35.)

Muræna anguilla, *Ham. Buch. Fish. Ganges*, p. 22.
Muræna bengalensis, *Gray & Hardw. Ill. Ind. Zool.* (*from H. B.'s MSS.*).
Anguilla bengalensis, *Day, Fish. India*, p. 659, pl. clxviii, fig. 1 (see synon.).

Ahir, Maráthi; *Vellangoo*, Tamil; *Nga-mee-toung*, Arracan; *Salais* and *Cuchia*, Chittagong.

B. xii. D. 250–305. P. 18. A. 220–250. C. 10–12.

Length of head 3 to $3\frac{1}{6}$ in the distance between the snout and the vent; length of tail three sevenths more than that of the trunk. The distance between the gill-opening and the origin of the dorsal fin is one third or one fourth more than the length of the head; that between the origin of dorsal and anal fins equals

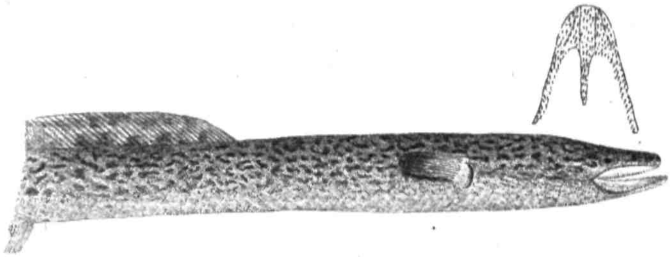

Fig. 35.—*Anguilla bengalensis* and upper teeth.

the length of the head. Head rather broader than the body; snout not broad. Lower jaw prominent. The cleft of the mouth is nearly or quite one third as long as the head, and extends behind the posterior edge of the orbit; diameter of latter $2\frac{1}{2}$ in the length of the snout. Lips well developed. *Teeth*—the vomerine band does not extend posteriorly so far as the maxillary one, the mandibular teeth divided by a longitudinal groove. *Fins*—pectoral equals about two sevenths of the length of the head. *Colour*—brownish above, becoming yellowish on the sides and beneath; the whole of the upper surface of the body, in some examples, covered with black spots and blotches, occasionally continued on to the dorsal fin, which has a light edging; anal with a dark marginal band and a light outer edging.

"It is an irritable creature, swelling its head whenever angered; and constantly, when it can, buries itself in putrescent carcases." (*Ham. Buch.*)

Hab. Islands in the Indian Ocean, continent of India and Burma. This eel is common at the Andaman Islands. It probably ranges to the Malay Archipelago, Formosa, and the Pacific. It attains four feet and upwards in length, and is much rarer on the hills than in the plains.

96. (2.) Anguilla bicolor.

Anguilla bicolor, *McClelland, Cal. Journ. Nat. Hist.* v, p. 178, t. 6, fig. 1; *Day, Fish. India*, p. 660, pl. clxvii, fig. 3, pl. clxviii, fig. 2.

Jee-tah-dah, Andamanese.

B. xii. D. 220–245. P. 18. A. 200–220. C. 10–12.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$ in the distance between the snout and the vent; length of tail one fourth to one sixth more than that of the trunk. *Eyes*—rather variable in size, usually about $2\frac{1}{2}$ dia-

meters in the length of the snout. Head very slightly broader than the body; snout rather broad; lower jaw scarcely longer than the upper. Extent of cleft of mouth equal to rather above one third of the length of the head, and extending to at least one diameter of the orbit behind the eye in the adult, to below it in the immature. Lips thick. *Teeth*—bands of nearly equal width, the vomerine reaching nearly as far backwards as those on the maxilla. *Fins*—dorsal commences above the vent or slightly before or behind it. *Colour*—of a dark olive above, becoming yellowish beneath.

Hab. Coasts of India to the Andamans and the Malay Archipelago.

4. Genus **CONGROMURÆNA**, Kaup.

Syn. *Gnathophis*, Kaup; *Ophisoma* and *Ariosoma*, Swainson.

Gill-openings wide. Eyes large. Cleft of mouth not extending behind the middle of the eye. Bones in fore part of head with large mucous canals. Posterior nostril patent and opposite the middle of the front edge of the eye; the anterior nostril tubular. Teeth small and pointed, forming bands, those in the jaws not constituting a cutting-edge; vomerine band elongated and narrow. Dorsal fin commencing nearly opposite the gill-opening; the pectoral and also the vertical fins (which are continuous round the tail) well developed. Scaleless.

Geographical Distribution. Tropical and subtropical seas.

97. (1.) **Congromuræna anago.** (Fig. 36.)

Conger anago, *Temm. & Schleg. Fauna Japon., Pisces*, p. 259, pl. 113, fig. 1.

Congromuræna anago, *Day, Fish. India*, p. 660, pl. clxix, fig. 2 (see synon.).

B. viii. P. 14. D. 170–196. A. 122–145. C. 10.

Length of head $2\frac{1}{2}$ to $2\frac{2}{3}$ in the distance between the end of the snout and the vent; length of trunk about one third less than that of the tail. Cleft of mouth 3 to $3\frac{1}{4}$ in the length of the head,

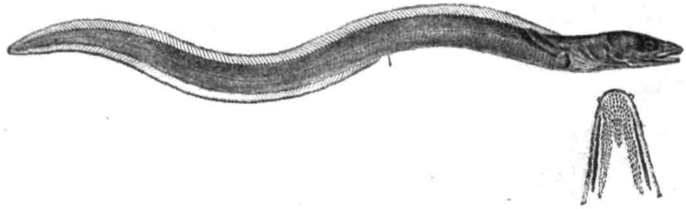

Fig. 36.—*Congromuræna anago* and upper teeth.

terminating below the middle of the eye. *Eyes*—large, 1 to $1\frac{1}{4}$ diameters in the length of the snout, and two thirds of a diameter

apart. Lips rather thick; upper jaw the longer. *Teeth*—of about equal size; the vomerine band extending backwards to about half the length of the maxillary band. *Fins*—dorsal commences slightly behind the gill-opening; pectoral nearly half as long as the head. *Colour*—brownish along the back, becoming dull white beneath. Fins yellow, the vertical ones with a narrow black edging. Upper half of pectoral occasionally stained with black.

Hab. Coromandel coast of India to the Malay Archipelago.

5. Genus **UROCONGER**, Kaup.

Syn. *Congerodon*, Kaup.

Gill-openings rather wide. Muciferous cavities on jaws moderately developed. Hind nostril in the form of a slit opposite the upper third of the orbit; front nostril not tubular. Eyes rather large. Cleft of mouth reaching to rather behind the middle of the orbit. Teeth fine, conical, and subequal in size; those in the jaws biserial; the vomerine teeth in a single elongated row and small. The dorsal fin commences above the root of the pectoral: all the fins well developed. Scaleless.

Geographical Distribution.—Seas of India to the Malay Archipelago, China, and the Philippines.

98. (1.) **Uroconger lepturus.** (Fig. 37.)

Congrus lepturus, *Richardson, Voy. Sulphur, Ich.* p. 106, pl. 56, figs. 1–6.

Uroconger lepturus, *Day, Fish. India*, p. 661, pl. clxx, fig. 1 (see synon.).

Tolaka, Maráthi.

B. ix. P. 10. D. 200–220. C. 10. A. 120–150.

Length of head $2\frac{1}{2}$ to $2\frac{3}{4}$ in the distance between the end of the snout and the vent; length of trunk about half that of the tail. Cleft of mouth rather oblique, and ceasing below the hind edge of the eye; the extent equals about two fifths of the length of the head.

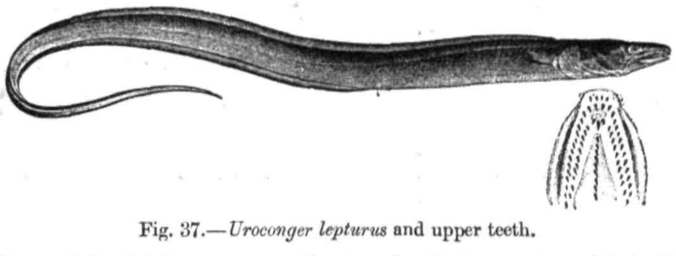

Fig. 37.—*Uroconger lepturus* and upper teeth.

Eyes—2 to $2\frac{1}{4}$ diameters in the length of the snout, and 1 to $1\frac{1}{6}$ diameters apart. Snout depressed, with a row of slit-like openings above the edge of the upper lip. *Teeth*—rather large and unequal

in size; those in the jaws in two rows, placed a slight distance apart, the inner row somewhat the larger; vomerine teeth in a single pointed row about equal in size to the inner maxillary row, one of the anterior teeth is sometimes enlarged. *Fins*—the dorsal commences above the base of the pectoral, which latter equals about one fourth of the length of the head. *Colour*—brownish above, becoming dull white beneath: a row of white-edged glandular openings along the lateral line. Vertical fins edged with black.

Hab. Seas of India to the Malay Archipelago and China.

6. Genus **MURÆNESOX**, McClelland.

Syn. *Cynoponticus*, Costa, and *Brachyconger*, Bleeker.

Gill-openings wide, approximating to the abdomen. Snout rather elongated, the upper jaw the longer. Two pairs of nostrils, the posterior of which are opposite to the upper part or centre of the orbit. Teeth in the jaws rather fine, with some canines anteriorly; vomer with several rows of teeth, the middle of which are large and conical or compressed. Dorsal fin commencing above the gill-opening; it, the anal, caudal, and pectoral well developed. Vent a long distance from the gill-opening. Scaleless.

The comparative proportions of the parts in these fishes vary considerably with age, season, and food.

Geographical Distribution. Tropical Seas.

Synopsis of Indian Species.

Vomerine teeth large, and without basal lobes. 1. *M. talabon*, p. 90.
Vomerine teeth slender, the posterior ones with basal lobes; the external mandibular row directed outwards.................... 2. *M. talabonoides*, p. 91.
Vomerine teeth large, and having a basal lobe; external mandibular row not directed outwards............................ 3. *M. cinereus*, p. 91.

99. (1.) **Muræenesox talabon.** (Fig. 38.)

Muræna talabon, *Cuvier, Règne An.* ed. 2, ii, p. 350, note 4.
Muræenesox talabon, *Day, Fish. India*, p. 661, pl. clxviii, fig. 5 (see synon.).

Tala-bon and *Culim-poun*, Tel.: *Kotah* or *Kulivi-pamboo*, Tamil; *Thong-bonto*, Arracan; *Kyla mutchee*, Chittagong; *Nga thembau lowk*, Burmese.

B. xvii–xix. P. 15–16. D. 270–285. C. 10. A. 195–210.

Length of head one third of the distance between end of snout and vent; length of trunk about one fourth less than that of the tail. Extent of cleft of mouth about half of length of head. *Eyes*—diameter one third of length of snout, distance apart 1 diameter. *Teeth*—on the vomer consisting of a row of moderately large, lanceo-

late, widely set ones, without any basal lobes; mandibular teeth much smaller than the vomerine, and those in the external row not directed outwards. *Fins*—the dorsal commences a short distance before the base of the pectoral; the anal under about the fifty-fifth dorsal ray, just posterior to the vent. *Colour*—upper surface of

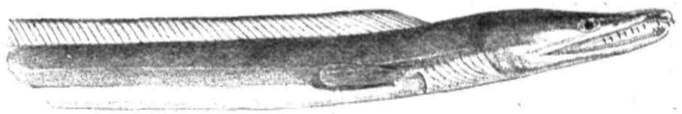

Fig. 38.—*Murænesox talabon.*

back and head olive, becoming brown posteriorly; abdomen dull white, becoming silvery inferiorly. The throat, cheeks, and gill-covers with golden reflections; vertical fins with dark margins.

Hab. Seas of India to the Malay Archipelago; attaining ten feet or more in length.

100. (2.) Murænesox talabonoides.

Conger talabonoides, *Bleeker, Batavia, Verhand. Nat. Ver.* xxv, *Mur.* p. 20.

Murænesox talabonoides, *Day, Fish. India,* p. 662, pl. clxviii, fig. 3 (see synon.).

B. xviii–xix. P. 15. D. 245–250. C. 10. A. 200–205.

Length of head one third of the distance between end of snout and vent; length of trunk rather less than that of the tail. Extent of the cleft of the mouth about half of the length of the head. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in the length of the snout, and 1 diameter apart. *Teeth*—the anterior on the vomer are straight, slender, compressed, and elongated, while the posterior have a small basal lobe in front and behind; the outer mandibular teeth are directed outwards. *Fins*—the dorsal commences in advance of the base of the pectoral, the latter fin contained $3\frac{2}{3}$ times in the length of the head. *Colour*—silvery, becoming white on the abdomen; vertical fins yellowish, with a narrow black outer border.

Hab. Seas and estuaries of India to the Malay Archipelago. This is the rarest of the three forms of this genus found in India.

101. (3.) Murænesox cinereus.

Muræna cinerea, *Forsk. Desc. Anim.* pp. x and 22.

Murænesox cinereus, *Day, Fish. India,* p. 662, pl. clxviii, fig. 4 (see synon.).

B. xx–xxii. P. 14–16. D. 230–270. C. 10. A. 190–220.

Length of head $2\frac{1}{2}$ to $2\frac{2}{3}$ times in the distance between end of snout and vent; length of trunk rather less than that of the tail. Extent of cleft of mouth equals rather less than half the length of

9. Genus **OPHICHTHYS**, Ahl.

Syn. *Ophisurus*, *Pœcilocephalus*, and *Cœcilia*, Lacép.; *Cæcula*, Vahl; *Sphagebranchus*, Bl. Schn.; *Murænopsis*, Lesueur; *Dalophis*, Raf.; *Leptognathus*, Swainson; *Apterichthys*, Duméril; *Leptorhynchus*, Smith; *Ichthyapus*, Bris. de Barneville; *Centrurophis*, *Pœcilocephalus*, *Microdonophis*, *Cæcilopis*, *Herpetoichthys*, *Brachysomophis*, *Elapsopis*, *Mystriophis*, *Echiophis*, *Scytalophis*, *Leptorhinophis*, *Pisoodonophis*, *Lamnostoma*, *Anguisurus*, *Cirrhimuræna*, *Callechelys*, *Ichthyapus*, *Ophisuraphis*, *Crotalopsis*, Kaup; *Achirophichthys*, Bleeker; *Macrodonophis* and *Uranichthys*, Poey.

The gill-openings may be close together. Snout greatly or moderately produced. Cleft of mouth wide or of medium width; lips may or may not be fringed. Teeth in jaws and on vomer, either pointed and granular, or small and conical; in the maxilla they may be in from one to four rows or in bands, while in the mandibles they may be in one or two rows; canines present or absent. Dorsal fin, when present, commences either in advance of or nearly above the gill-opening, or behind the root of the pectoral; the pectorals, when present, may be rudimentary, or only developed in the adult, or else of moderate size; anal present or absent. Extremity of tail free.

This genus has been regarded by some authors as a Family; in all the species the extremity of the tail is free, and there are vomerine teeth.

Synopsis of Indian Species.

A. Teeth obtuse or granular. Pectorals present or absent.
- Head $3\frac{1}{2}$ to 4 times in length of trunk; body nearly two thirds of total length ...... 1. *O. boro*, p. 94.
- Head $7\frac{1}{3}$ to 8 times in length of trunk; body rather above a third of the total length.. 2. *O. microcephalus*, p. 95.
- Head 8 to 9 times in length of trunk; body about half of total length. Body surrounded by brown rings, between which are sometimes spots.................... 3. *O. colubrinus*, p. 96.

B. Teeth pointed and in a single row. Pectorals absent.
- Head $3\frac{1}{2}$ to 4 times in length of trunk; body half of total length .... 4. *O. orientalis*, p. 96.
- Head $7\frac{1}{2}$ in length of trunk; body about as long as tail. 16 to 17 large dark spots along the lateral line .... 5. *O. ornatissimus*, p. 97.

105. (1.) **Ophichthys boro.** (Fig. 41.)

Ophisurus boro, *Ham. Buch. Fish. Gang.* p. 20, t. v, fig. 5.
Ophichthys boro, *Day, Fish. India*, p. 664, pl. clxxi, fig. 2 (see synon.).

B. xxix–xxxi. D. 320–400. P. 13. A. 250–270.

Length of head (to gill-opening) from $3\frac{1}{2}$ to 4 times in the dis-

tance between the snout and the vent; length of trunk nearly two thirds of the total. *Eyes*—from 2 to $2\frac{1}{2}$ or even 3 diameters from end of snout, and slightly nearer angle of mouth than end of snout. Upper jaw the longer; cleft of mouth extending some distance

Fig. 41.—*Ophichthys boro* and upper teeth.

behind the eye. Snout rather depressed in the young and obtuse in the adult. *Teeth*—granular, in a large patch on maxilla, and in several smaller rows on premaxillaries; large and in several rows on the vomer; two outer granular rows in mandible, with an inner pointed row. The form of the teeth is subject to considerable variation: thus they are usually conical in the young, which character may be retained in the adult age (*O. hyala*); or the young in some instances have globular-headed teeth; the number of rows of teeth is not constant. *Fins*—dorsal low; it commences about the length of the pectoral behind the posterior margin of that fin, and does not quite reach the tip of the tail. Pectoral rounded or pointed, its length equals about one fourth of the distance between the snout and its base. Anal low, not extending to the tip of the tail. *Colour*—greenish olive above, with many minute black spots, becoming greenish white below; the dorsal fin with a dark edging.

The natives in some parts of Bengal imagine that this fish proceeds from the ear of a porpoise. Sir Walter Elliot was informed that in some parts of Madras those captured in salt-water creeks were eaten by the natives as a remedy for weakness or pains in the loins.

When breathing this fish distends its gill-cavities with air taken in at the mouth, while it can also respire that contained in the water. If its gill-openings are kept firmly closed, it takes in air by its mouth; should its mouth be kept shut it struggles until released so as to be able to respire. If the gills are exposed by removing the gill-membranes, it slowly moves its branchiæ, and is able to respire without taking in air by the mouth.

Hab. Seas and estuaries of India and Malay Archipelago, ascending large rivers to far above tidal reach. It attains to at least 24 inches in length.

106. (2.) Ophichthys microcephalus.

Ophichthys microcephalus, *Day, Fish. India,* p. 665 pl. clxx, fig. 2.

Length of head from $7\frac{1}{3}$ to 8 in the distance between the end of the snout and the vent; tail nearly twice as long as trunk ($1\frac{7}{9}$). *Eyes*—of moderate size, situated behind the middle of the distance

between the snout and the angle of the mouth. Extent of cleft of mouth from end of snout $3\frac{1}{2}$ in the length of the head. Anterior tubular nostrils well developed. *Teeth*—obtusely conical and in three rows. *Fins*—low, the dorsal commences over the last third of the pectoral fin, neither the dorsal nor anal is continued round the end of the tail. Pectoral $3\frac{1}{4}$ to $3\frac{1}{3}$ in the length of the head. *Colour*—olive above, becoming of a dull yellow on the sides and beneath; fins externally stained with black.

Hab. Three examples, none less than 25 inches in length, were captured in Malabar.

107. (3.) **Ophichthys colubrinus.**

Muræna colubrina, *Boddaert, Pallas's Neue Nord. Beytr.* ii, 1781, p. 56, pl. 2, fig. 3.
Ophichthys colubrinus, *Day, Fish. India,* p. 665, pl. clxvii, fig. 4 (see synon.).

" B. xxv. circ. D. 510, circ. A. 318, circ. P. 10, circ."—Bleeker.

Length of head 8 to 9 times in the distance between the end of the snout and the vent; length of trunk about equal to that of the tail; snout projecting. Extent of cleft of mouth equals about $\frac{2}{7}$ to $\frac{1}{4}$ of the length of the head. *Eyes*—rather small, situated behind the middle of the cleft of the mouth. Snout rather pointed. *Teeth*—with rounded crowns and in two rows. *Fins*—the dorsal fin commences in front of the gill-opening, just behind the nape; it and the anal are rather low; pectoral rudimentary. *Colour*—numerous (25 to 35) brown rings surround the body. In some examples a dark round spot exists in the interspace between each ring on the body.

Hab. Red Sea, Andamans to the Malay Archipelago, and beyond.

108. (4.) **Ophichthys orientalis.**

Dalophis orientalis, *McClelland, Cal. Journ. Nat. Hist.* 1845, v, p. 213.
Ophichthys orientalis, *Day, Fish. India,* p. 665, pl. clxxi, fig. 1 (see synon.).

Manti-bukaro-paumbu, Tel.

Length of head $3\frac{1}{2}$ to 4 in the distance between the end of the snout and the anus; tail as long as the trunk. *Eyes*—small, placed rather behind the middle of the length of the head. The gill-openings are longitudinal slits almost parallel one to the other. Snout projecting, extending beyond the lower jaw, and the openings of the nostrils are on the lower surface. *Teeth*—pointed and in a single row. *Fins*—the dorsal commences at a short distance behind the gill-openings, it and the anal being low; pectorals absent. *Colour*—olive, becoming lightest beneath; one or two rows of round whitish spots across the occiput, having a short line of similar spots directed forward on either side.

"Very common at Madras. The boys catch it at the edge of the surf by bruising a crab in their hands and throwing it into the water, then walking about over the spot, and when they feel an eel about their feet they stoop down and suddenly dash it on to the sand with both hands. If thrown on the moist sand they burrow themselves, *tail foremost*, almost instantaneously." (*Jerdon.*)

Hab. Seas and estuaries of Ceylon and up the Bay of Bengal, certainly as high as Orissa. It attains at least a foot in length.

109. (5.) Ophichthys ornatissimus.

Herpetoichthys ornatissimus, *Kaup, Cat. Apodal Fish.* p. 7, fig. 4.
Ophichthys ornatissimus, *Day, Fish. India*, p. 665 (see synon.).

Length of head from snout to gill-opening $7\frac{1}{2}$ in the length of the trunk; length of tail rather less than that of the trunk. Head depressed. *Eyes*—near end of snout. Jaws of nearly equal length. *Teeth*—pointed, those on the maxilla and front of the vomer in a double, the remainder in a single row. *Fins*—dorsal low, commencing behind the end of the pectoral, the latter with 24 rays and about one fourth the length of the head. *Colour*—irregular dark spots on the head. One transverse and two longitudinal rows of white spots on the occiput; two curved whitish lines between the eyes; sixteen to seventeen large, round, black spots along the lateral line, which are separated by another band of spots of different sizes. Dorsal fin with black marginal spots and stripes.

Hab. Malabar, whence an example 20·8 inches long was brought by Dussumier.

10. Genus MORINGUA, Gray.

Syn. *Raitaborua*, Gray; *Ptyobranchus*, McClell.; *Pterurus*, Swainson; *Aphthalmichthys*, Kaup; *Pseudomoringua*, Bleeker.

Body subcylindrical, with the trunk considerably longer than the tail. Gill-openings rather narrow and inferior; heart far posterior to the branchiæ. Cleft of mouth narrow. The posterior nostril situated in front of the eye. Teeth in a single row. Vertical fins limited to the tail; pectorals, if present, small. Scales absent.

Geographical Distribution. Seas of India to the Malay Archipelago and Japan.

Synopsis of Indian Species.

Length of head 6 to $6\frac{1}{2}$ in that of the trunk; trunk longer than the tail .... 1. *M. raitaborua*, p. 98.
Length of head $5\frac{3}{4}$ in that of the trunk; trunk at least $\frac{2}{3}$ longer than the tail .. 2. *M. macrocephala*, p. 98.

110. (1.) **Moringua raitaborua.** (Fig. 42.)

Muræna raitaborua, *Ham. Buch. Fish. Ganges*, pp. 25, 364.
Moringua raitaborua, *Day, Fish. India*, p. 666, pl. clxx, fig. 3 (see synon.).

Length of head from snout to gill-opening 6 to $6\frac{1}{2}$ in the distance from snout to vent; length of tail from two fifths to three eighths of the entire length. Height of body equals one third of length of head. *Eyes*—rather high up, and 2 to 3 diameters from end of snout; jaws of equal length in front, or the lower slightly the longer.

Fig. 42.—*Moringua raitaborua* and upper teeth.

Cleft of mouth extends above 1 diameter of the orbit behind its posterior margin. Gill-opening a slit at the side of the pectoral fin. *Teeth*—in a single row directed backwards, pointed. *Fins*—dorsal slightly developed, it commences about the length of the head posterior to the anus; the anal arises a short distance behind the anus; both fins are interrupted in the middle, but posteriorly developed and join the caudal. Pectoral equals about one sixth of its distance from the snout. *Lateral line*—distinct. *Colour*—coppery, olive, or even purplish above, becoming silvery underneath; some black dots. Vertebræ 90+14.

Hab. Estuaries of the Ganges to the Malay Archipelago; attaining at least 22 inches in length.

111. (2.) **Moringua macrocephala.**

Aphthalmichthys macrocephalus, *Bleeker, Atl. Ich.* iv, p. 17, t. 147, fig. 2.
Moringua macrocephala, *Day, Fish. India*, p. 666 (see synon.).

Length of head from snout to gill-opening $5\frac{3}{4}$ in the distance from snout to vent; trunk at least two thirds longer than tail. Cleft of mouth about one fifth of the length of the head. *Fins*—a few rays at the end of the tail, otherwise the vertical and pectoral fins are reduced to mere cutaneous folds.

Hab. India and the Malay Archipelago.

Family III. SILURIDÆ.

Margin of the upper jaw formed mainly by the premaxillaries; the maxilla rudimentary, often constituting the base of a barbel; no subopercle. The rayed dorsal fin or the adipose dorsal may be present or absent. Skin scaleless, and either smooth or covered with osseous plates, or scattered tubercles. Air-bladder, when present, either free in the abdominal cavity or more or less enclosed in bone; it communicates with the organs of hearing by means of the auditory bones. Cæcal appendages absent.

The Siluroid, or scaleless, fishes are popularly termed Cat-fishes, owing to most of them being provided with feelers or long barbels arranged around the mouth. They mostly prefer muddy to clear water, and the more developed the barbels, the more these fishes appear to be adapted for an inland or muddy freshwater residence. The wider and deeper the rivers, the more suited they are for the *Siluridæ*, consequently the larger forms are comparatively rare in the south of India, whilst they abound in the Indus, Jumna, and Ganges, also in the Irrawaddy and other Burmese rivers.

Owing to their usual resort, these fishes appear to employ their feelers in moving about in muddy places, and consequently have less use for their eyes than forms that reside in clear pieces of water. This is one reason why the size of the eye as compared with the length of the head is much greater in the young than in the adult. The eye in fact atrophies, it does not increase in size in proportion with the remainder of the head. In some species, the skin of the head passes over the eye without any trace of a free orbital margin.

In the genus *Arius* and some allied marine forms, the males appear to carry the ova in their mouths perhaps until the young are produced.

Many of these fishes are credited with causing poisonous wounds, and we frequently find such cases admitted into hospitals. The injuries may be divided into two classes, (1) those in which the wounds are of a distinctly venomous description, (2) those in which the jagged spines occasion intense inflammation often of a dangerous character.

The respiration of these fishes is effected in two ways, and it may be appropriate here to refer to the amphibious fishes of India, as the *Labyrinthici* and *Ophiocephalidæ*. Respiration in fishes is carried out normally, (1) by their using the air which is in solution in the water to oxygenate the blood at their gills, (2) by taking in atmospheric air direct, which is employed at a special organ, where it oxygenates the blood, which can be returned for use into the general circulation without going through the gills. The true amphibious fishes respire by the latter method. No doubt we observe that fishes which normally oxygenate their blood solely at their gills, do rise to the surface in very hot weather, when the water is

foul, or insufficiently charged with air, and take in air by the mouth; likewise we find that those which mainly take in atmospheric air direct by the mouth may, to a certain extent, be able to use their gills. If fishes having these two different modes of respiration are placed in a globe of water, across which a diaphragm of net is inserted below the surface, so as to prevent their obtaining access to the atmosphere, those of the first class which oxygenate their blood at the gills are unaffected, whereas those which have accessory breathing-organs and take in air direct, or amphibious fishes, die from blood-poisoning.

Amongst the *Siluridæ*, *Clarias* has a dendritic apparatus attached to the branchiæ (see fig. 48, p. 114), and *Saccobranchus* has a long air or respiratory sac passing backwards amongst the muscles of the back from behind the gill-cavity proper. The blood from the heart goes up the bulbus arteriosus, and divides into branches on either side, one of which goes to each respiratory air-sac, the anterior on the right, the posterior on the left side. The one on the right goes along the upper wall of the sac, whilst that on the left traverses the lower wall, giving off numerous lateral branches. From this respiratory air-sac the purified blood is returned by a vessel which conveys it direct to the aorta.

It is thus evident that blood can be purified at these respiratory air-sacs, and these fishes can be kept alive hours, and even days, without being in water, thus enabling them to traverse considerable distances where aquatic respiration would be impossible. They are also able, when in water, to depurate some of the blood at the gills, if occasion should render it necessary for them to do so.

The air- or swim-bladder (not respiratory air-sac) exists in two forms amongst the *Siluridæ*. In marine species it is thick and not enclosed in bone, likewise in most of the freshwater forms found in the waters of the plains; but as we approach the hills a change occurs, and in most of the genera the air-bladder possesses an osseous covering.

Geographical Distribution. Tropical and subtropical seas and rivers. Fishes of this family are very abundant in the fresh waters of India, likewise in the estuaries and sea; they are not so common, however, in the clear waters around the Andamans, and are nearly absent from the Red Sea.

Uses. As a rule (excluding *Pseudeutropius*, *Callichrous*, and *Ailia*), the Siluroids are more eaten by the poorer than by the richer classes, and for two reasons—first, they are forbidden to Jews and Mahomedans, and secondly, they are very foul feeders. *Saccobranchus* and *Clarias*, however, are deemed nourishing and often prescribed for patients recovering from illness. The air-bladders of the marine forms are collected for export to China, as they afford a coarse isinglass.

Synopsis of Indian Genera.

First group. HYPOSTOMATINA.

Gill-membranes confluent with the skin of the isthmus; gill-openings small. The rayed dorsal fin, if present, belongs to the abdominal portion of the vertebral column, being in advance of the ventrals. Adipose dorsal present. Pectorals and ventrals horizontal. Air-bladder partially or wholly enclosed in bone.

Osseous plates along the back. The adipose fin in the form of a short spine. Upper caudal ray very elongate	1. SISOR.
An adipose fin. An adhesive apparatus formed of transverse folds of skin situated on the chest between the bases of the pectoral fins	2. PSEUDECHENEIS.
No long caudal ray, osseous dorsal plates, nor adhesive apparatus. A low adipose fin..	3. EXOSTOMA.

Second group. CHACINA.

Gill-membranes confluent with the skin of the isthmus; gill-openings small. Rayed dorsal and anal fins consisting each of two portions; a strong serrated spine in front of the first dorsal fin, while the posterior portions of both fins are confluent with the caudal. No adipose fin. Ventral with six rays. Air-bladder not enclosed in bone.

Mouth very wide. Eyes rudimentary......	4. CHACA.

Third group. PLOTOSINA.

Gill-membranes not confluent with the skin of the isthmus; gill-openings wide. Rayed dorsal fin in two portions; the anterior with few rays, and armed with a pungent spine, the posterior long and confluent with the caudal, as is also the long anal. No adipose dorsal. Ventral many (12) rayed. A dendritic post-anal organ. Air-bladder not enclosed in bone.

Teeth on the palate. Pectoral with a spine.	5. PLOTOSUS.

Fourth group. CLARIINA.

Gill-membranes not confluent with the skin of the isthmus; gill-openings wide. Rayed dorsal fin single, spineless and elongated, posteriorly neither it nor the anal confluent with the caudal. No adipose dorsal. A dendritic accessory branchial apparatus attached to the convex side of some of the branchial arches, and received into a recess above and behind the true gill-cavity. Air-bladder transverse, lobed, and enclosed in bone.

Teeth on the palate. A pectoral spine. Ventral with six rays	6. CLARIAS.

Fifth group. SILURINA.

Gill-membranes more or less separate from the isthmus, which they overlap, their hind edges being free even if united to one another.

The rayed dorsal fin, if present, belongs to the abdominal portion of the vertebral column, being in advance of the ventrals. Adipose fin present or absent.

a. Length of the anal fin nearly equal to that of the caudal portion of the vertebral column. Gill-openings wide.

Teeth on the palate. Barbels four or six. Rayed dorsal fin without spine; no adipose fin. Pectoral with a spine. Ventral with eight or more rays; anal with from sixty to ninety rays. Air-bladder free .... 7. SILURUS.

Teeth on the palate. Barbels eight. Rayed dorsal fin with a short spine, an adipose fin; no pectoral spine. Ventral with six, anal with from fifteen to about twenty-three rays. Caudal rounded or lanceolate. Air-bladder free .... 8. OLYRA.

No teeth on the palate. Barbels eight. Dorsal fin with one spine and six rays; a small pectoral spine. Anal rather short (eleven to twelve rays). Ventral with six rays; caudal forked. Air-bladder enclosed in bone .... 9. AMBLYCEPS.

Teeth on the palate. Barbels eight. A short spineless dorsal, also an adipose fin; an elongated anal one (sixty to eighty rays). A strong pectoral spine. Ventral with six rays. An elongated respiratory air-sac, extending backwards amongst the muscles of the back on either side of the neural spines. Air-bladder enclosed in bone .... 10. SACCOBRANCHUS.

Cleft of mouth deep, extending to behind the eyes. Teeth on the vomer. Barbels four. Rayed dorsal fin short, spineless; no adipose fin. A pectoral spine. Ventral with nine or ten rays; anal with sixty-five to ninety-five rays. Air-bladder free .... 11. WALLAGO.

Teeth on the palate. Barbels eight. A short dorsal fin with a spine, also an adipose fin. A pectoral spine; an elongated anal fin (forty-seven to fifty rays). Ventral with six rays. Air-bladder partially protected by bone .... 12. EUTROPIICHTHYS.

Cleft of mouth does not extend to the eye. Teeth on the vomer. Barbels two or four. Rayed dorsal fin when present small; no adipose fin. A pectoral spine. Ventral with ten or less rays; anal with from about forty-five to ninety-five rays. Air-bladder free .... 13. CALLICHROUS.

Teeth on the palate. Barbels eight. No rayed dorsal, but an adipose fin. Pectoral with a spine; an elongated anal (sixty to seventy-five rays); a pectoral

spine. Ventral with *six* rays. Air-bladder partially protected by bone .... 14. AILIA.
Similar to *Ailia* but destitute of ventral fins.. 15. AILIICHTHYS.
Teeth present on the palate. Barbels eight. Dorsal and pectoral spines. An adipose dorsal. Ventral with six or eight rays; anal with from about twenty-seven to fifty-five rays. Air-bladder free. 16. PSEUDEUTROPIUS.
Teeth present on the palate. Barbels four. Dorsal and pectoral spines; an adipose dorsal. Ventral with six, anal with from about twenty-nine to thirty-nine rays. Air-bladder free .... 17. PANGASIUS.
Teeth on the palate. Barbels two or four. A short dorsal having a spine, also an adipose fin; an elongated anal (forty or fifty rays). A pectoral spine. Ventral with six rays. Air-bladder partially protected by bone .... 18. SILUNDIA.

b. Length of the anal fin much less than the caudal portion of the vertebral column.

Gill-openings very wide, the membranes not confluent with the skin of the isthmus, but overlapping one another, being cleft nearly to the chin. Teeth present on the palate. Barbels eight. Dorsal and pectoral spines; an adipose fin. Ventral with six, anal with from about eight or nine to twenty or more rays. Air-bladder free .... 19. MACRONES.
Gill-openings very wide, the membranes not confluent with the skin of the isthmus, but overlapping one another, being cleft nearly to the chin. Teeth present on the palate. Barbels six or eight. Dorsal and pectoral spines; an adipose fin. Ventral with six, anal with from about fifteen to twenty rays. Air-bladder free .... 20. LIOCASSIS.
Gill-openings wide, the membranes not confluent with the skin of the isthmus, and scarcely or not notched. Teeth present on the palate. Barbels six or eight. Strong dorsal and pectoral spines, an adipose fin. Ventral with seven or eight rays, anal with twelve to thirteen. Air-bladder free .... 21. RITA.
Gill-openings wide, the membranes not confluent with the skin of the isthmus, and scarcely or not notched. Teeth present or absent on the palate. Barbels six. Dorsal and pectoral spines; an adipose fin. Ventral with six, anal with from about fourteen to at least twenty-four rays. Air-bladder free .... 22. ARIUS.
Gill-openings wide, the membranes not con-

with rough ridges. Mouth small, transverse, inferior, the upper jaw the longer. *Barbels*—the maxillary reach the pectoral spine, and are dilated at their bases. From the lower lip there is a sort of flap, having a rather long barbel at either side, which reaches the gill-opening; and two more intermediate but shorter ones; between these flaps are several short barbels on a transverse line across the chin. There are five plates on either side of the base of

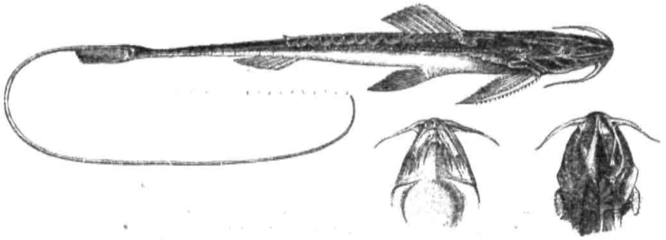

Fig. 43.—*Sisor rhabdophorus.*

the dorsal fin, behind which the back has six elevated scale-like plates along the median line; the last forms a spine before the vertical from the anal fin. The last half of the body is covered by 12 osseous rings, having a sharp edge above and on each side, as is seen in the pipe-fishes. The lateral line has also a series of smaller rough bony plates. *Fins*—dorsal rather higher than long, its first undivided ray weak, and finely serrated anteriorly. Pectoral spine compressed, not quite so long as the head, serrated on both edges, but in general strongly so externally. The ventrals arise under the posterior dorsal rays. The anal commences behind the vertical from the spine on the back. Upper caudal ray with a long prolongation. *Colour*—blackish above, lighter below.

Hab. Indus, Sind, Ganges, and Jumna rivers in Northern India, Bengal, and Behar: the largest I have seen was about 8 inches long, excluding the caudal filament. Not uncommon at Delhi. This fish is only eaten by the lowest and poorest classes. It is said to lie under stones when young.

2. Genus **PSEUDECHENEIS**, Blyth.

Gill-openings small, not extending on to the lower surface of the head, the gill-membranes being attached to a very broad isthmus. Body somewhat elongate; head rather depressed. An adhesive apparatus formed of transverse folds of skin situated on the thorax between the bases of the pectoral fins. Eyes small, subcutaneous, on the upper surface of the head. Mouth transverse, small, inferior. Nostrils on either side approximating, divided by a barbel Barbels eight, the maxillary pair with broad bases. Teeth villiform in the jaws, palate edentulous. Dorsal

fin with one spine and six rays; the adipose of moderate extent. Pectoral with its inner third vertical, its lower two thirds horizontal, its spine feebly serrated. Ventral horizontal, having six rays, and situated below the dorsal. Caudal emarginate. Air-bladder in rounded lateral portions enclosed in bone.

This genus is evidently adapted for an existence in rapids.

113. (1.) **Pseudecheneis sulcatus.** (Fig. 44.)

Glyptosternon sulcatus, *McClelland, Cal. Journ. Nat. Hist.* ii, p. 587, pl. vi.

Pseudecheneis sulcatus, *Day, Fish. India,* p. 500, pl. cxvi, fig. 1 (see synon.).

D. 1/6 | 0. P. 1/13. V. 6. A. 11–13 (2–4/7–9). C. 17.

Length of head $7\frac{1}{2}$, of caudal fin 6, height of body 6 in the total length. *Eyes*—small, situated midway between the hind edge of the opercle and the nostrils; the width of the interorbital space $3\frac{1}{4}$ in the length of the head. Lower surface of the head with numerous papillæ, especially near the symphysis. The width of

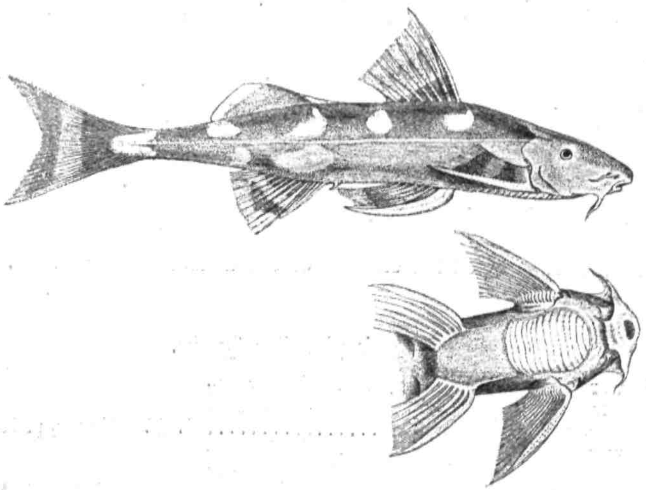

Fig. 44.—*Pseudecheneis sulcatus.*

the head equals its length. *Barbels*—the maxillary pair equal to about one third of the length of the head. *Fins*—spine of anterior dorsal broad, weak, crenulated posteriorly; base of the adipose dorsal as long as the interspace between the two dorsal fins. Pectoral large and extending to above the base or first third of the ventral; pectoral spine broad, finely ctenoid externally in its lower half, crenulated internally, especially in its posterior soft termination.

In some specimens the under surface of the pectoral spine and first ventral ray are striated. Caudal emarginate, lower lobe the longer. The thoracic sucker has about 14 transverse folds. The free portion of the tail about three times as long as deep at its base. *Colour*—blackish, with some large, irregular, yellowish blotches. Fins yellow, with black bands.

Hab. Darjeeling and Khasi hills, attaining 7 to 8 inches in length.

3. Genus **EXOSTOMA**, Blyth.

Syn. *Chimarrichthys*, Sauvage.

Gill-openings narrow, the membranes confluent with the skin of a broad isthmus. Head depressed and covered superiorly with soft skin. No thoracic adhesive apparatus. Mouth inferior, with the lips reflected around the whole or most of its circumference, and usually covered with tubercles. Nostrils close together, separated by a barbel. Eight barbels. Teeth in the jaws in several rows; palate edentulous. Anterior dorsal fin with a rudimentary spine and six rays; adipose fin long and low. Pectorals vertical in their upper, horizontal in their lower half, the spine enclosed in skin. Ventral composed of six rays, inserted some distance behind the rayed dorsal, shaped like the pectoral. Caudal square, emarginate or forked. Air-bladder enclosed in bone.

This peculiar mountain genus has its lips adapted for a sucker, the chest likewise appears to form a flat adhesive surface, bounded by the striated rays of the pectoral and ventral fins.

Geographical Distribution. From the upper waters of the Indus, along the Himalayas and the Mishmee Mountains in East Assam, to Eastern Tibet on the confines of China; also in Tenasserim.

Synopsis of Indian Species.

Lower labial fold uninterrupted. Anal commences much nearer the base of the caudal than that of the ventral	1. *E. labiatum*, p. 108.
Lower labial fold interrupted. Anal commences in last third of the distance between ventral and base of caudal	2. *E. blythii*, p. 109.
Snout more pointed. Caudal forked	3. *E. berdmorei*, p. 109.
Lower labial fold interrupted. Anal commences nearer the base of the ventral than that of the caudal	4. *E. stoliczkæ*, p. 110.

114. (1.) **Exostoma labiatum.**

Glyptosternon labiatus, *McClell. C. J. N. H.* ii, p. 588.
Exostoma labiatum, *Day, Fish. India*, p. 501 (see synon.).

D. 1/6 | 0. P. 1/11–12. V. 6. A. 1/5. C. 17.

Length of head 5, of pectoral 5, of caudal fin 5, height of body 8 in the total length. *Eyes*—small, situated in the posterior two fifths of the head. Mouth small, inferior, transverse: jaws in the form of a double crescent or ω-shape. Lips broad, with a median and a lateral lobe on either side, having a barbel between. Nasal barbels reach the end of the snout: the maxillary extend to the pectoral fin. *Fins*—as in the next species. Caudal slightly forked. *Colour*—uniform.

Hab. Mishmi Mountains, East Assam.

115. (2.) **Exostoma blythii.**

Exostoma blythii, *Day, Fish. India,* p. 501, pl. cxvii, fig. 2.

D. 1/6 | 0. P. 1/17. V. 6. A. 8 (2/6). C. 13.

Length of head $4\frac{3}{4}$, of caudal fin $6\frac{1}{2}$, height of body 5 in the total length. *Eyes*—small, situated on the upper surface of the head: the width of the interorbital space nearly equals the length of the snout, which is broad and depressed. Mouth inferior and transverse, sulcus behind lower lip interrupted. Gill-openings not continued on to the lower surface of the head. *Barbels*—the nasal about three times as long as the orbit; a fleshy appendage to the maxilla having a rudimentary barbel; two pairs behind the lower lip arising on a transverse line. *Teeth*—none on the palate. *Fins*—pectoral subhorizontal, its rays plaited below; base of adipose more than twice as long as that of the rayed fin. Dorsal arising slightly in advance of the ventrals, its spine weak. Ventrals subhorizontal. Caudal with its outer rays slightly produced, rendering it almost lunated. *Air-bladder*—small, in two rounded lobes, both enclosed in a bony capsule. *Colour*—yellowish brown.

Hab. Rivers below Darjeeling; up to at least $3\frac{1}{5}$ inches long.

116. (3.) **Exostoma berdmorei.**

Exostoma berdmorei, *Blyth, J. A. S. B.* xxix, 1860, p. 155; *Day, Fish. India,* p. 502 (see synon.).

D. 1/6 | 0. P. 1/10. V. 6. A. 6. C. 14.

Maxillary barbels reach the base of the pectoral fin. The snout is much more pointed than in the other species. *Fins*—caudal rather deeply forked. *Colour*—"dingy olive-brown, with obscure dark broad bands, presenting more or less of a clouded appearance; the fins mostly darker, below pale."

Hab. Tenasserim. The typical specimen (4 inches long) in the Calcutta Museum is in such a very bad state of preservation that I am unable to add to Blyth's description.

slightly the longer, the width of the gape of the mouth equalling two fifths of the length of the head. *Barbels*—the nasal reach the hind edge of the eyes, the maxillary one half to two thirds as long as the head, the mandibular shorter. *Fins*—dorsal spine rather strong, one third as long as the head and serrated on both sides. *Colour*—chestnut-brown, with two bluish-white longitudinal bands, the superior proceeding from above the eye along the base of the dorsal fin, the inferior from the maxilla along the middle of the side of the body. Bleeker observed that these bands entirely disappear in adults. Vertical fins with black edges.

Wounds from the pectoral spines of this fish are much dreaded by the natives of India and are said to cause severe inflammation or even tetanus.

Hab. From the Red Sea and east coast of Africa through the seas of India to Japan and Polynesia.

Fourth group. CLARIINA.

6. Genus **CLARIAS**, Gronovius.

Syn. *Macropteronotus*, Lacépède; *Cossyphus* and *Phagorus*, McClelland.

Branchiostegals seven to nine. Gill-openings wide, the membranes not being confluent with the skin of the isthmus, and separated by a deep notch. A dendritic accessory branchial apparatus, attached to the convex side of the second, third, and fourth branchial arches, is received into a recess above and behind the usual gill-cavity. Head depressed, gape of mouth of moderate

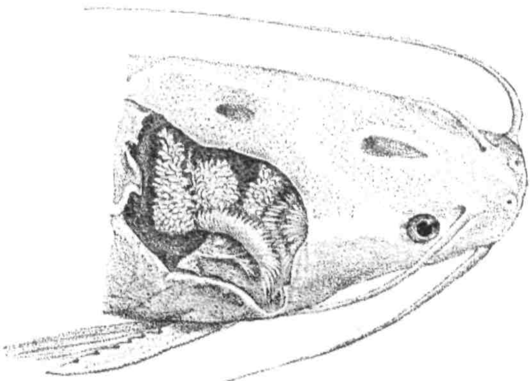

Fig. 48.—*Clarias magur*, showing accessory branchial apparatus.

extent, anterior and transverse. Eyes small, with a free circular margin. Barbels eight. Teeth villiform in the jaws and in a band across the vomer. Dorsal fin long and spineless, extending from the neck to the caudal fin, with which it is continuous: no adipose fin. Ventral with six rays. Pectoral with a spine. Airbladder small, transverse, lobed, and enclosed in bone.

Mr. Kitchen Parker, F.R.S. (on the shoulder-girdle, Ray Society, 1868, p. 29), observed of the air-bladder and its surroundings in *Clarias* :—"The remarkable trumpet-shaped cavities belong to the atlas and axis vertebræ, and they are strongly attached to the post-temporals and clavicles at their point of junction ; they lodge the lateral cornua of the three-lobed air-bladder. These cavities are very imperfect below ; but this deficiency is largely supplemented by a transverse splint on each side, attached below to the anterior edge of the great cylinder of the atlas. There is a smaller splint in each cavity, and two smaller splints eke out the mouth of each of these trumpets. The large obliquely transverse splints (they are sometimes turned backwards) meet within a line and a half below the centrum of the atlas, between and behind the splints. This and the next centrum are deeply grooved."

Geographical Distribution. Throughout Africa and Western Asia to India, Ceylon, Burma, Siam, the Malay Archipelago, Hong Kong, the Philippines and beyond. These fish being amphibious, live for some time after removal from their native element.

Uses. Considered by the natives of India as exceedingly wholesome and invigorating.

Synopsis of Indian Species.

D. 62–76, A. 45–58. Vomerine teeth villiform. 1. *C. magur*, p. 115.
D. 70–77, A. 53–63. Vomerine teeth obtuse. 2. *C. teysmanni*, p. 116.
D. 69–70, A. 50–59. Pectoral spine externally serrated. Vomerine teeth very obtuse.... 3. *C. dussumieri*, p. 117.
D. 64–68, A. 46–50. Vomerine teeth obtuse and in two pyriform bands.............. 4. *C. assamensis*, p. 117.

Macropteronotus jagur of Hamilton Buchanan, Fish. Ganges, pp. 145, 374, appears to be a monstrosity of *Clarias magur*, in which the last few vertebræ have been accidentally lost or removed, and the new caudal fin has become continuous with the dorsal fin superiorly and the anal inferiorly.

121. (1.) **Clarias magur.** (Figs. 48, 49.)

Macropteronotus magur, *Ham. Buch. Fish. Ganges*, pp. 146, 374, pl. xxvi, fig. 45.
Clarias magur, *Day, Fish. India*, p. 485, pl. cxii, fig. 5 (see synon.).

Kug-ga, Punj. ; *Mah-gur*, Beng. ; *Magurah*, Ooriah ; *Nga-khoo*, Burmese and Mugh. ; "*Măngri*, Patna, and *Monghir*, H. Buch." ; *Marpoo*, Tel.

B. ix. D. 62–76. P. 1/8–11. V. 6. A. 45–58. C. 15–17.

Length of head to end of gill-covers $5\frac{2}{3}$, of caudal fin $8\frac{3}{4}$, height of body $6\frac{1}{2}$ to $7\frac{1}{2}$ in the total length. *Eyes*—diameter 8 in the length of the head, 2 to $2\frac{1}{2}$ diameters from the end of the snout, the width of the interorbital space equals one half the length of the head. The greatest width of the head equals its length.

Upper jaw the longer, the width of the gape of the mouth equals four ninths of the length of the head. Head shagreened superiorly and covered with fine granules. Two depressions on the head, the anterior oblong and situated so that its first fourth is between the eyes; the posterior oval and placed midway between the posterior extremity of the anterior fossa and the end of the occipital process. Occipital process rounded behind, the width of its base

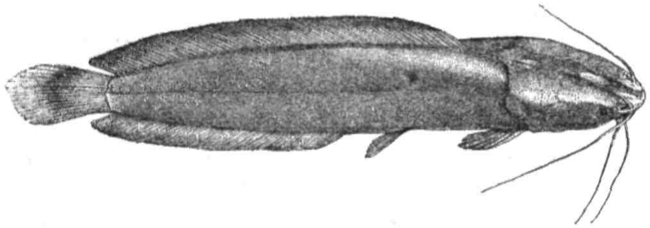

Fig. 49.—*Clarias magur.*

rather above twice its length. *Barbels*—the nasal reach the base of the occipital process; the maxillary the base or middle of the pectoral fin, the mandibular are shorter. *Teeth*—on the vomer villiform, not so fine as those in the jaws and becoming a little blunted with age, they form an uninterrupted band which in its centre is as wide as the premaxillary band or rather narrower. *Fins*—pectoral fin reaching to below the commencement of the dorsal; pectoral spine finely serrated, but covered with skin. Caudal free. *Colour*—dingy green or brownish superiorly, becoming lighter beneath; the vertical fins usually with reddish margins.

Hab. Fresh and brackish waters of the plains of India, Burma, Ceylon, and the Malay Archipelago. This fish lives long after its removal from its native element, being amphibious. It attains at least a foot and a half in length. As food it is deemed highly nourishing.

122. (2.) Clarias teysmanni.

Clarias teysmanni, *Bleeker, Batavia, Nat. Tijdsch.* xiii, p. 344; *Day, Fish. India*, p. 484 (see synon.).

B. ix. D. 70–77. P. 1/7–10. V. 6. A. 53–63. C. 17. Vert. 16/41.

Length of head to end of opercle 5 to $5\frac{1}{2}$, height of body $6\frac{1}{2}$ to $7\frac{1}{2}$ in the total length. *Eyes*—situated in the commencement of the second third of the total length of the head to the end of the occipital process. The greatest width of the head equals its length to hind edge of opercle. Head nearly smooth. Occipital process two thirds as long as wide at its base. *Barbels*—the nasal as long as the head, the maxillary reach the end of the pectoral fin, the mandibular are shorter. *Teeth*—those on the vomer somewhat obtuse, forming a crescentic band which in its centre is about equal in

width to the premaxillary band. *Fins*—the pectoral extends nearly to below the origin of the dorsal; spine of pectoral moderately strong, more than two thirds the length of the fin, rugose or finely serrated along its outer edge, serrated internally. Caudal free. *Colour*—brownish.

Hab. Ceylon and Java.

123. (3.) Clarias dussumieri.

Clarias dussumieri, *Cuv. & Val. H. N. Poiss.* xv, p. 382; *Day, Fish. India*, p. 484 (see synon.).

B. ix. D. 69–70. P. 1/8. V. 6. A. 50–59. C. 16.

Length of head to end of gill-cover 6, of caudal fin 9, height of body $8\frac{3}{4}$ in the total length. *Eyes*—in the commencement of the front third of the distance between the end of the occipital process and the snout; the width of the interorbital space equal to half the length of the head. The greatest width of the head equals its length; its upper surface finely shagreened and covered with skin; on it are two depressions—the anterior, which is oblong, extends to opposite the front margin of the eyes; the posterior, which is oval, is midway between the posterior end of the anterior depression and that of the occipital process, which last is scarcely produced and $3\frac{1}{2}$ times as wide at its base as it is long. *Barbels*—the nasal reach the hind edge of the eye, the maxillary the base of the pectoral fin, those on the lower jaw are shorter. *Teeth*—those on the palate with globular heads and in an uninterrupted curved band, which is rather wider than that on the premaxillaries. *Fins*—pectoral spine rather strong; its length equals half the distance between the base of the occipital process and the end of the snout; it is rather strongly serrated externally with a few recurved spines near its extremity, more feebly internally, whilst the length of the fin only equals half the distance between its base and that of the ventral, it does not quite reach to below the origin of the dorsal. Caudal distinct from the other vertical fins.

Hab. Malabar and Pondicherry to the Malay Archipelago.

124. (4.) Clarias assamensis.

Clarias assamensis, *Day, Fish. India*, p. 485.

Mah-gur, Assamese.

B. ix. D. 64–68. P. 1/8–11. V. 6. A. 46–50. C. 14.

Length of head to end of opercle $5\frac{3}{4}$ to $6\frac{1}{4}$, of caudal fin $8\frac{1}{3}$, height of body $6\frac{1}{3}$ to 7 in the total length. *Eyes*—in the commencement of the anterior third of the total length of the head, width of the interorbital space equal to two fifths of the total length of the head. The greatest width of the head equals its length between the snout and the hind edge of the opercle; the width of the gape of the mouth equals one third of the total length of the head. Upper

surface of the head very finely shagreened and covered with thin skin; two depressions on the head—the anterior oblong and reaching forwards to between the middle of the eyes; the posterior oval and commencing midway between the posterior end of the anterior fossa and the end of the occipital process, which latter is rounded, and twice as broad at its base as it is long. *Barbels*—the nasal reach to the base of the occipital process, the maxillary to the end of the pectoral spine, the mandibular are shorter. *Teeth*—those on the vomer globular and arranged in two pyriform bands, the widest end internal and exceeding the width of the premaxillary band. *Fins*—pectoral reaches to below the commencement of the dorsal fin and halfway to the base of the ventral, its spine strong, one third of the total length of the head, rough externally, serrated internally. Ventral reaches anal. Vertical fins not confluent with the caudal. *Colour*—greenish brown, vertical fins edged with red.

This fish appears to take the place of *C. magur* in Assam, and I have procured it from Goalpara and as high as Sadiya. Its teeth distinguish this from other species or possibly varieties.

Hab. Upper and Lower Assam.

Fifth group. SILURINA.

7. Genus **SILURUS**, Artedi.

Syn. *Parasilurus*, pt., Bleeker.

Dorsal profile nearly horizontal; head covered with soft skin. Gill-openings wide, the gill-membranes not confluent with the skin of the isthmus, and deeply notched. Mouth transverse. Eyes without free orbital margins, situated above the level of the angle of the transversely placed mouth. Nostrils remote from one another. Barbels six (*Silurus*, Bleeker); or four (*Parasilurus*, Bleeker); one pair being maxillary, and one or two pairs mandibular. Teeth cardiform or villiform in the jaws, in one or two transverse bands on the vomer, none on the palatines. One very short and spineless first dorsal but no adipose fin; anal terminates close to the caudal, but is not usually continuous with it; ventrals situated posterior to the dorsal, and consisting of eight or more rays. Air-bladder not enclosed in bone.

Geographical Distribution. Eastern Europe, Central and South-eastern Asia. In India and Burma this genus is represented in the gháts on the Western coast; along the Himalayas from Afghanistan to Darjeeling, also in the hills above Akyab and the Tenasserim provinces, in Cochin China and beyond. These fishes, so far as I know, have not been recorded from waters of the plains of India.

Synopsis of Indian Species.

A. With six barbels. (*Silurus.*)	
A. 58–62. Vomerine band of teeth interrupted. Leaden, shot with purple.	1. *S. wynaadensis*, p. 119.
B. With four barbels. (*Parasilurus.*)	
A. 70–78. Vomerine band of teeth uninterrupted. Purplish brown	2. *S. afghana*, p. 119.
A. 62–64. Vomerine band of teeth interrupted. Leaden, shot with purple.	3. *S. cochinchinensis*, p. 120.

125. (1.) Silurus wynaadensis. (Fig. 50.)

Silurus wynaadensis, *Day, P. Z. S.* 1873, p. 237; *and Fish. India*, p. 480, pl. cxi, fig. 6 (see synon.).

B. xii–xiv. D. 5. P. 1/10. V. 8. A. 58–62 (2/58–60). C. 19.

Length of head 6 to 7, of caudal fin 10, height of body 8 to $8\frac{1}{2}$ in the total length. *Eyes*—small, situated just above the angle of the mouth, from $2\frac{1}{2}$ to 3 diameters from the end of snout, and 5 apart. The greatest width of the head equals its length behind

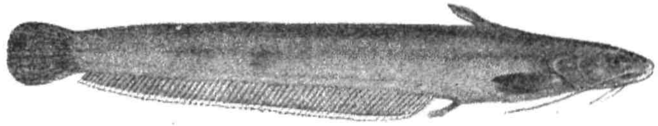

Fig. 50.—*Silurus wynaadensis.*

the nostrils; lower jaw slightly the shorter and rather elevated in the centre. Width of the gape of the mouth equals the postorbital length of the head. A row of large open pores along the lower jaw and across the cheeks. *Barbels*—the maxillary nearly twice as long as the head, the mandibular pair on each side situated one anterior to the other at a distance equalling one diameter of the orbit, both extend nearly to the base of the pectoral fin. *Teeth*—two oval patches on the vomer divided by a short interspace. *Fins*—dorsal small, situated anterior to the origin of the ventral. Pectoral with a short but strong spine ending in a soft termination. Ventrals reach the origin of the anal, the latter is divided from the rounded caudal by a notch. *Colour*—leaden, becoming purplish beneath and covered all over with small black points; some specimens have a dark finger-mark on the shoulder.

Hab. Wynaad, in a stream about 3000 feet above the level of the sea. Said never to exceed 12 inches in length.

126. (2.) Silurus afghana.

Silurus afghana, *Günther, Catal.* v, p. 34; *Day, Fish. India*, p. 481, pl. cxii, fig. 1 (see synon.).

D. 2. P. 1/13–14. V. 10. A. 70–78. C. 19.

Length of head 6 to $6\frac{1}{2}$, of caudal fin 9 to 12, height of body 9 to 12 in the total length. *Eyes*—small, situated above and behind the angle of the mouth and in the anterior half of the head; the width of the interorbital space rather exceeds half the length of the head. Upper jaw slightly the longer. *Barbels*—four, the maxillary reach the base of the ventral, the single mandibular pair as long as the head. A single row of six widely separated open glands under the mandible. *Teeth*—in a single uninterrupted horseshoe-shaped band on the vomer. *Fins*—the pectoral as long as the head behind the eyes, rounded, its spine moderately strong, short, entire, and having a soft termination; dorsal fin rudimentary, and in the anterior third of the total length excluding the caudal fin; anal and caudal scarcely united. *Colour*—uniform, purplish black or brown.

Hab. The Himalayas; Griffith is said to have sent this fish from Afghanistan, but some Khasi hill specimens were unfortunately mixed with his Afghan collections. I received several specimens from Dr. Duka, who obtained them at Darjeeling, and Jerdon presented some to the British Museum, the largest of which is about 7·2 inches in length; the locality was not stated, but the specimens probably came from either the Kashmir or Assam regions.

127. (3.) Silurus cochinchinensis.

Silurus cochinchinensis, *Cuv. & Val. H. N. Poiss.* xiv, p. 352; *Day, Fish. India,* p. 481, pl. cxiii, fig. 2 (see synon.).

B. xiv–xv. D. 4. P. 1/11. V. 10. A. 62–64 (2/60–62). C. 17.

Length of head 6 to $6\frac{1}{2}$, of caudal fin $7\frac{1}{2}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—minute, situated in the commencement of the anterior half of the head, and above the angle of the mouth. Upper jaw slightly the longer. The width of the head equals its length behind the nostrils. *Barbels*—the maxillary about twice the length of the head, the mandibular pair rather shorter than the head. *Teeth*—in two oval spots on the vomer divided by a smooth interspace. *Fins*—dorsal arises before the origin of the ventral. Pectoral with a short but strong and scarcely serrated spine; ventrals extend to the origin of the anal, which last is slightly joined to the caudal, the latter being rounded. *Colour*—leaden, purplish below, and covered all over with minute black points, which sometimes form an irregular finger-mark on the shoulder. Caudal sometimes yellow.

Hab. The hill-ranges above Akyab, Tenasserim, and Cochin China.

8. Genus OLYRA, McClelland.

Syn. *Branchiosteus,* Gill.

Body elongate and low, the dorsal profile nearly horizontal; head depressed and covered above with soft skin. Gill-openings

wide, the gill-membranes not being confluent with the skin of the isthmus, but notched nearly to the chin. Mouth terminal and transverse; jaws of about equal length, or the lower the longer. Nostrils remote from one another, the posterior provided with a barbel. Barbels eight. Eyes small. Villiform teeth in the jaws and on the palate. First dorsal fin without a spine, and with from six to eight rays; adipose dorsal long and low. Anal of moderate length (15 to 23 rays); ventrals inserted below the dorsal and with five or six rays; caudal lanceolate or rounded. Air-bladder not enclosed in bone. Skin smooth.

Gill subdivided the genus into those species which have the jaws subequal in length, the anal with more than 20 rays, and the caudal lanceolate (*Olyra*); and those in which the lower jaw projects, the anal has less than 20 rays, and the caudal is rounded (*Branchiosteus*).

Geographical Distribution. Small fishes from the Khasi hills and British Burma.

Synopsis of Indian Species.

D. 7/0, A. 18–23. Jaws of equal length. Caudal lanceolate	1. *O. longicaudata*, p. 121.
D. 8/0, A. 16. Jaws of equal length. Caudal lanceolate	2. *O. burmanica*, p. 121.
D. 6/0, A. 15. Lower jaw the longer. Caudal rounded	3. *O. laticeps*, p. 122.

128. (1.) **Olyra longicaudata.**

Olyra longicaudata, *McClelland, Calc. Jour. N. H.* ii, p. 588, pl. xxi, fig. 1; *Day, Fish. India*, p. 475, *and Supplement*, p. 806 (see synon.).

B. vi. D. 7/0. P. 1/4. V. 5. A. 18–23. C. 12.

Length of head 7, height of body 14 in the total length. *Eyes*—behind the angle of the mouth and above its level, small, the diameter of each equal to half the length of the snout; they are two diameters apart. *Barbels*—eight, the maxillary reaching the base of the pectoral fin, the remainder short. *Fins*—rayed dorsal as high as the body, the adipose very low. Pectoral spine strong and serrated, the fin being as long as the ventral, the latter arises below the commencement of the dorsal and nearer the vent than the gill-opening. Anal scarcely so high as the body above it. Caudal lanceolate, its upper rays being prolonged.

Hab. A small species obtained from the Khasi hills and Tenasserim.

129. (2.) **Olyra burmanica.** (Fig. 51.)

Olyra burmanica, *Day, Fish. India*, p. 475, pl. cxi, fig. 5.

D. 8/0. P. 1/4. V. 7. A. 16 (3/13). C. 17.

Length of head 7½, of caudal fin 3, height of body 7½ in the total length. *Eyes*—small, subcutaneous, and in the anterior half of

the head, above the level of the angle of the mouth. Jaws of nearly equal length, head depressed. Nostrils patent, wide apart, the posterior with a barbel in front of it, the anterior just over the

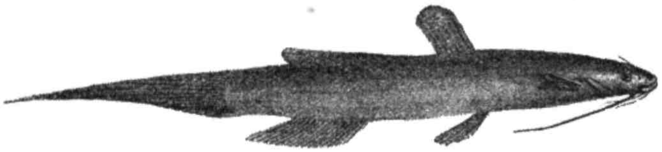

Fig. 51.—*Olyra burmanica.*

snout, but not in front of it. Gill-openings wide, not confluent with the isthmus, and extending laterally to opposite the end of the opercle. *Barbels*—eight, not dilated at their bases, the maxillary the longest, almost extending to the base of the ventral fin, the external mandibular as long as the head. *Teeth*—villiform in both jaws, those in the outer row slightly the longest; in an uninterrupted horseshoe-shaped band across the palate. *Lateral line*—present. Skin smooth. *Air-bladder*—large, thin, and in the abdominal cavity. *Fins*—dorsal without any spine, its first ray the shortest, it arises opposite the ventral; adipose dorsal very low and long. Pectoral spine rather strong, slightly serrated externally, coarsely so internally, the fin only extends halfway to the ventral. The anal rays increase in length to the last. Caudal with its central rays strongest and elongated, making the fin one third of the total length. *Colour*—dark brown.

Hab. Pegu Yoma or Mountains.

130. (3.) **Olyra laticeps.**

Olyra laticeps, *McClelland, Calc. Jour. N. H.* ii, p. 588, pl. xxi, fig. 2; *Day, Fish. India*, p. 475 (see synon.).

B. xiii. D. 6/0. P. 1/9. V. 7 (6?). A. 15. C. 18.

Eyes—small and vertical. Head much depressed at the snout. Lower jaw longer than the upper. Six or eight slender barbels. *Teeth*—villiform in the jaws, palate edentulous. *Fins*—the anal rays gradually increase in length from the commencement of the fin. Caudal entire.

Hab. Khasi hills.

9. Genus **AMBLYCEPS**, Blyth.

Branchiostegals twelve. Gill-openings wide, the gill-membranes not confluent with the skin of the isthmus, notched as far forwards as the chin. No thoracic adhesive surface. Head covered with soft skin. Eyes small, subcutaneous. Mouth anterior; gape wide. Nostrils close together, the posterior having a barbel. Teeth in jaws villiform; palate edentulous. Anterior dorsal fin enveloped

in skin, having one spine and six rays. Pectoral with a concealed spine. Ventral with six rays, inserted behind the vertical from the posterior margin of the rayed dorsal. Anal rather short (9 to 12 rays). Caudal forked. Air-bladder almost entirely enclosed in bone. No axillary pore.

Geographical Distribution. Small fishes inhabiting the fresh waters of India and Burma, usually on or near hills. Griffith observed (Cal. Journ. N. Hist. ii, p. 564) respecting certain fish from the Mydan valley in Afghanistan, "the most remarkable fish is a dark-coloured loach-like *Silurus*, which is not uncommon about Julraiz."

I have a large series of this fish, and they show such diversities that it appears to me that all are varieties of one species.

131. (1.) **Amblyceps mangois.** (Fig. 52.)

Pimelodus mangois, *Ham. Buch. Fish. Ganges*, pp. 199, 379.
Amblyceps mangois, *Day, Fish. India*, p. 490, pl. cii, fig. 6, and pl. cxvii, fig. 1 (see synon.).

Billi, "a cat," and *Sudaal*, Punj.

B. xii. D. 1/6 | 0. P. 1/7. V. 6. A. 9–12 (2–3/7–9). C. 19. Vert. 12/23.

Length of head 6¼, of caudal fin 6, height of body 7 to 9 in the total length. *Eyes*—small, situated in the anterior two fifths of the head. Mouth wide, lower jaw somewhat the longer. *Barbels*—nasal as long as the head, and equalling the internal mandibular

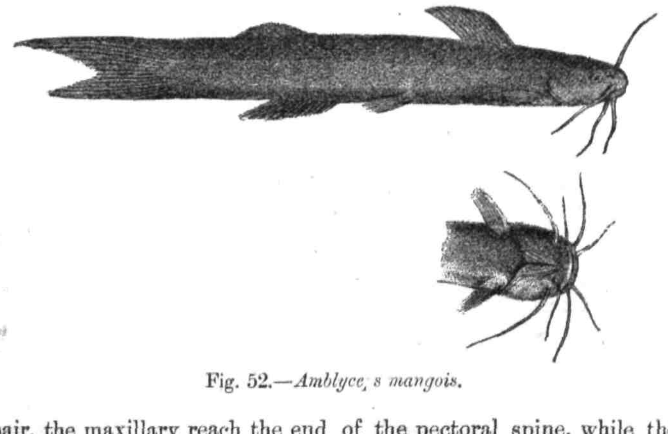

Fig. 52.—*Amblyceps mangois.*

pair, the maxillary reach the end of the pectoral spine, while the outer mandibular are not quite so long. *Fins*—dorsal not so high as the body, and situated in the commencement of the second fifth of its total length, dorsal spine about half as high as the rays; the latter are partly enveloped in skin, as are also those of the

anal. Adipose dorsal low, the length of its base equalling that of the rayed fin, and two thirds of the interspace between the two fins. Pectoral scarcely extending halfway to the base of the ventral, which latter does not reach the anal. Caudal deeply forked, its upper lobe the longer. Caudal peduncle as high as long. *Lateral line*—absent. *Air-bladder*—has a small rounded lobe on either side of the body of the second vertebra, and all but a small portion of its front surface enclosed in bone. *Colour*—olive-brown, lightest beneath. In some a dark line commences opposite the opercles and soon subdivides—one branch going to the centre of the base of the caudal, the other to the base of the anal.

Hab. The Himalayas; found in the Jumna for some considerable distance from the hills, also through Burma to Moulmein. This fish does not appear to exceed 5 inches in length. When captured it bites most viciously, and lives for some time after its removal from the water.

10. Genus **SACCOBRANCHUS**, Cuvier and Valenciennes.

Syn. *Heteropneustes*, Müller.

Branchiostegals seven. Gill-openings wide, the membranes not being confluent with the skin of the isthmus, and separated by a deep notch. Gill-cavity having an accessory posterior sac, which extends backwards on either side of the neural spines amongst the muscles of the abdominal and part of the caudal region. Head depressed, covered with very thin skin; mouth transverse. Eyes with a free circular margin. Barbels eight. Teeth present in the jaws and on the vomer. Dorsal fin short and spineless; ventral with six rays situated under the dorsal. Anal long and confluent with the caudal or separated from it by a notch. Air-bladder placed transversely across the bodies of the anterior vertebræ, where it is enclosed by bone; two ducts pass upwards, one from either side of the air-vessel, unite, and open into the inferior surface of the pharynx.

Geographical Distribution. Fresh waters of India, Ceylon, and Burma, extending to Cochin China, but not found in the Malay Archipelago. Fishes of this genus can live long after their removal from the water.

Uses. Considered exceedingly wholesome and invigorating by the natives of India, but in some places deemed by the Brahmins to be impure.

Synopsis of Indian Species.

Anal fin united to the caudal. D. 8, A. 70.
Eyes small .... 1. *S. microps*, p. 125.
Anal fin separated from the caudal by a notch.
D. 6–8, A. 60–79 .... 2. *S. fossilis*, p. 125.

132. (1.) Saccobranchus microps.

Saccobranchus microps, *Günther, Catal.* v, p. 31; *Day, Fish. India,* p. 486.

D. 8. P. 1/6. A. 70.

Length of head $7\frac{1}{2}$, height of body 8 in the total length. *Eyes*—much smaller than in *S. fossilis*, and less than one third the length of the snout. *Barbels*—the nasal reach the end of the pectoral, the maxillary the root of the ventral fin. *Teeth*—the vomerine band is interrupted in its centre. *Fins*—origin of the dorsal is two sevenths of the length (excluding the caudal fin) from the end of the snout. Pectoral spine feebly serrated, two thirds as long as head. Ventral fin reaching the anal, which last is united with the caudal. *Colour*—brown.

Hab. Ceylon, growing to 6 inches in length.

133. (2.) Saccobranchus fossilis. (Fig. 53.)

Silurus fossilis, *Bloch, Ich.* t. 370, fig. 2.
Saccobranchus fossilis, *Day, Fish. India,* p. 486, pl. cxiv, fig. 1 (see synon.).

Bitchu ka mutchee and *Singi*, Hind.; *Singee* and *Sheen-ee*, Assam. *Thay-lee*, Tam.; *Mar-pu*, Tel.; *Singee*, Ooriah, Beng. and N.W. Prov.; *Nga-gyee* and *Nga-khoo*, Burmese and Mugh.; *Lahoord* (young), *Nullie* (adult), Punj.; *Kahree-meen*, Mal.; *Lo-har*, Sind.; (*Kamacha singgi*, Bhāgālpūr, H. B.).

B. vii. D. 6–7. P. 1/7. V. 6. A. 60–79. C. 19.

Length of head from $5\frac{1}{2}$ to 7, of caudal fin from about 9 to 14, height of body (greatly depending upon food or season) from 5 to 8 in the total length. The width of the head equals its length, and that of the gape of the mouth is contained $2\frac{1}{4}$ to $2\frac{1}{2}$ times in the length of the head. *Eyes*—from 2 to 3 diameters from end of snout. *Barbels*—the maxillary extend to the middle of the pectoral,

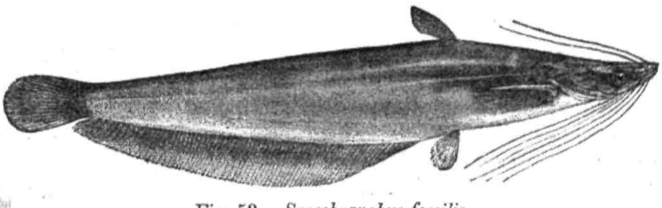

Fig. 53.—*Saccobranchus fossilis.*

or even the commencement of the ventral fins. *Teeth*—those on the vomer in a pyriform patch on either side, converging anteriorly, widely divergent posteriorly. *Fins*—the dorsal commences rather before the anterior third of the body; the ventrals reach to the third or fourth anal ray or just to the origin of that fin. Pectoral spine serrated internally, it usually has a few serrations externally at its anterior end; it is from two thirds to

135. (1.) **Eutropiichthys vacha.** (Fig. 55.)

Pimelodus vacha, *Ham. Buch. Fish. Gang.* pp. 196, 378, pl. 19, fig. 64.
Eutropiichthys vacha, *Day, Fish. India*, p. 490, pl. cxiv, fig. 6 (see synon.).

Butchua and *Nandi butchua*, Ooriah; *Chel-lee*, Sind.; *Nee-much*, N.W. Prov.; *Váchá*, Beng.; *Nga-myen-kouban*, *Katha-boung*, and *Nga-myee-ying*, Burmese.

B. xi. D. 1/7 | 0. P. 1/13-16. V. 6. A. 3-4/41-47. C. 17.

Length of head $5\frac{1}{2}$ to $5\frac{3}{4}$, of caudal fin 5, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—with broad adipose lids, diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in the length of the head, 1 diameter from the end of snout, and 1 to $1\frac{1}{4}$ apart. Width of the head equals its length behind the middle of the eyes. Cleft of mouth rather oblique, its extent being one fourth more than the width of the gape; the angle situated under the middle or hind third of the eyes; snout compressed and pointed, the upper jaw being slightly the longer. *Barbels*—the nasal pair reaching to the hind edge of the head or even slightly further; maxillary ones to the end of preopercle, or they may be even as long as the head; the mandibular ones, which

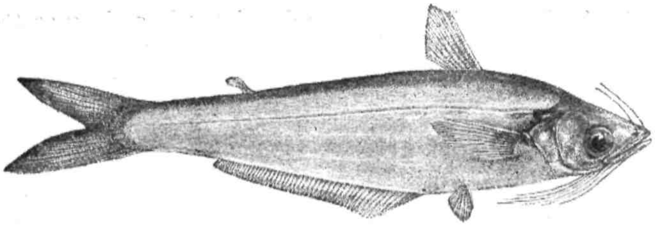

Fig. 55.—*Eutropiichthys vacha.*

arise on a transverse line across the chin, are rather shorter. *Teeth*—sharp in the jaws, in a pyriform band on the palatines, the latter with those on the vomer forming an uninterrupted band, that nearly touches the band on the upper jaw. *Fins*—dorsal spine thin, serrated posteriorly, and usually as long as the head, excluding the snout. Pectoral fin reaching the base of the ventral; pectoral spine rough externally, serrated internally, and as long as that of the dorsal. Ventral situated under the posterior dorsal rays, and only extending halfway to the anal. Free portion of the tail as high as long. *Colour*—silvery, greyish along the back; pectoral and caudal usually edged with black.

Variety *Eutropiichthys burmannicus* has A. 4/55, and its nasal barbels almost reach to the dorsal fin, the maxillary to the middle of the pectoral spine, whilst all the others are longer than the head. The pectoral spine is serrated externally, and reaches the anal fin.

Hab. From the Punjab through the large rivers of Sind, Bengal, and Orissa, and variety *E. burmannicus* in Burma. This species attains upwards of a foot in length. It is good eating.

13. Genus CALLICHROUS, Hamilton Buchanan.

Syn. *Ompok*, Lacép.; *Kryptopterus*, *Kryptopterichthys*, *Micronema*, *Phalacronotus*, *Hemisilurus*, *Silurodes*, *Pseudosilurus*, and *Silurichthys*, Bleeker; *Pterocryptis*, Peters.

Branchiostegals twelve to fifteen. Gill-openings wide; the membranes not confluent with the skin of the isthmus, deeply notched and overlapping. Head covered with skin. Cleft of mouth oblique, not extending so far as the front of the eyes; the lower jaw the longer. Eyes subcutaneous, situated behind and opposite the angle of the mouth, lateral or sometimes partially on the lower surface of the head. Barbels four or two, one pair maxillary, and some distance behind the symphysis a mandibular pair, the latter sometimes being rudimentary or even absent. Nostrils remote from one another. Teeth villiform in the jaws, in an uninterrupted (*Silurodes*, Bleeker) or interrupted (*Callichrous*, Bleeker) band on the vomer, none on the palatines. Dorsal fin spineless, short, rudimentary, or absent, when present anterior to the ventrals; no adipose fin. Pectoral with a spine. Anal long, continuous with (*Pterocryptis*, Peters) or terminating close to the caudal, the latter being forked, emarginate or rounded. Ventral with eight to ten rays. Air-bladder rather small, attached to the lower surfaces of the second to the fourth vertebræ, and not enclosed in bone. No axillary pore.

Geographical Distribution. Sind, India, Ceylon, Burma, through Siam, to the Malay Archipelago and China.

Uses. Although rarely exceeding a foot in length, these fishes are usually excellent as food, and from their quality have been termed "Butter-fish" by Europeans in Bengal, and are generally known as "*Puffta*," Hind.

Synopsis of Indian Species.

A. Anal fin united to the caudal.
- Teeth on the palate in an uninterrupted band. D. 2, A. 75. Maxillary barbels not quite so long as the head ...... 1. *C. gangeticus*, p. 130.
- Vomerine teeth in two separate patches. D. 4, A. 47. Maxillary barbels reach middle of pectoral fin .... 2. *C. sindensis*, p. 130.

B. Anal fin distinct from the caudal.
- A. 60–75, V. 8. Maxillary barbels reach ventral fin. Pectoral not so long as head, spine smooth or serrated .. 3. *C. bimaculatus*, p. 131.
- A. 66–71, V. 9–10. Maxillary barbels shorter than the head. Pectoral spine feebly serrated .... 4. *C. pabo*, p. 132.
- A. 69–73, V. 8. Eyes large. Maxillary barbels reach middle of fish. Pectoral fin reaches fourth or fifth anal ray .... 5. *C. macrophthalmus*, p. 132.

A. 61–69, V. 8. Maxillary barbels reach anal fin; of a purplish-brown colour	6. *C. malabaricus*, p. 133.
A. 54–60, V. 8. Maxillary barbels reach middle or end of pectoral fin.	7. *C. pabda*, p. 133.

136. (1.) Callichrous gangeticus.

Pterocryptis gangetica, *Peters, MB. Ak. Berl.* 1861, p. 712.
Callichrous gangeticus, *Day, Fish. India*, p. 476 (see synon.).

B. xii. D. 2. P. 1/12. V. 10. A. 75.

Length of head nearly one seventh, height of body two nineteenths of the total length. Maxillary barbels do not quite reach the pectorals, whilst the mandibular ones reach the edge of the gill-membrane. Vomerine teeth in an uninterrupted band. *Fins*—pectoral spine feebly serrated; anal united with the caudal.

Hab. Ganges. I have not procured this species in India, my nearest approach to it being *C. sindensis*.

137. (2.) Callichrous sindensis. (Fig. 56.)

Callichrous sindensis, *Day, Fish. India*, p. 476, pl. cx, fig. 1.

B. xii. D. 4. P. 1/12. V. 8. A. 47 (2/45). C. 13.

Length of head $4\frac{2}{3}$, of caudal fin 7, height of body $4\frac{2}{3}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the length of head, 1 diameter from end of snout, and 2 apart. The dorsal profile rather elevated, and a little concave over the orbits. The greatest width of the head equals its height, or its length excluding the snout. Cleft of mouth very oblique, the lower jaw prominent, and the eye situated rather

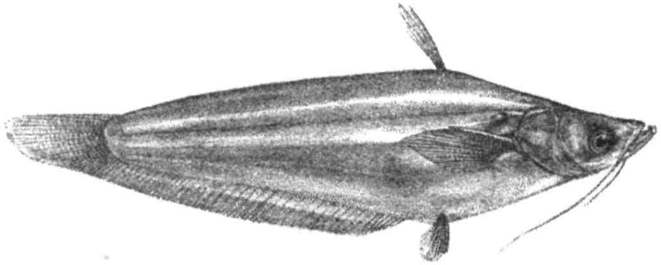

Fig. 56.—*Callichrous sindensis.*

above the angle of the mouth. *Barbels*—the maxillary reach to the middle of the pectoral fin; the mandibular are thin and nearly half as long as the head. *Teeth*—in two small oval patches on the vomer not confluent in the median line. *Fins*—dorsal narrow at its base. Pectoral spine as long as the head behind the middle of the eyes and finely serrated internally; the fin reaches to nearly above the commencement of the anal. Ventral reaches the first anal ray. Aanl united to the caudal. *Colour*—silvery, with a black spot behind the gill-opening and above the base of the pectoral fin; body and fins with numerous cloudy dark markings.

Hab. Sind from the Indus.

138. (3.) **Callichrous bimaculatus.** (Fig. 57.)

Silurus bimaculatus, *Bloch, Ich.* t. 364.
Callichrous bimaculatus, *Day, Fish. India,* p. 476, pl. cx, figs. 4 & 5 (see synon.).

Dáka-dúmú, Tel.; *Godla,* Canarese; *Dimmon,* Sind.; *Chotah-* or *Chéla-wahlah,* Tam.; *Poh-tah,* Ooriah; *Puh-boh,* Assam.; *Pufta, Goongwah,* and *Pallu,* Punj.; *Goong-wah-ree* and *Puf-ta,* N.W. Provinces; *Gugli,* Maráthi; *Kanee rabda,* Beng.; *Nga noothan,* Burmese.

B. xii. D. 4. P. 1/13. V. 8. A. 60–75 (2–3/58–72). C. 17.

Length of head 5 to 7, of caudal fin $6\frac{2}{3}$ to 7, height of body $5\frac{1}{3}$ to $5\frac{1}{2}$ in the total length. *Eyes*—situated opposite the angle of the mouth; diameter 4 to $5\frac{3}{4}$ in the length of the head, 1 to $1\frac{2}{3}$ diameters from the end of snout, and $2\frac{3}{4}$ to $3\frac{2}{3}$ apart. The greatest width of the head equals its length behind the angle of the mouth. The lower jaw very prominent, the width of the gape of the mouth equals the postorbital length of the head or its length to behind the middle of the eyes. *Barbels*—the maxillary pair reach the middle of the pectoral or the commencement of the anal. *Teeth*—in two small oval patches, one on either side of the vomer, and not continuous. *Fins*—dorsal arises in the commencement of the second two sevenths of the body, it is narrow and two thirds as high

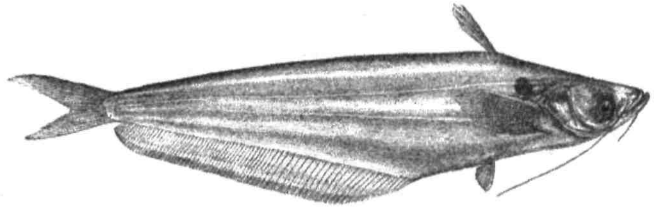

Fig. 57.—*Callichrous bimaculatus.*

as the body. Pectoral as long as the head behind the angle of the mouth, its spine of moderate strength, as long as the head behind the middle of the eyes, and strongly or feebly serrated on the inner side, or even entire. Anal ceases close to, but is not continuous with, the forked caudal. *Colour*—silvery shot with purple, a black spot on the shoulder behind the gill-opening and above the middle of the pectoral fin; in some specimens this black spot is much better defined than in others. Occasionally the caudal fin is tipped with black.

The character of the pectoral spine, whether smooth * or serrated, is not a specific distinction.

Hab. The fresh waters of Sind, and from the Punjab throughout India, Ceylon, and Assam to the Malay Archipelago and beyond. Sometimes observed in Burma, according to Col. Tickell, within tidal influence. Attains at least a foot and a half in length.

* At Trichinopoly I opened eight specimens having entire pectoral spines; all were females, one had 47,844 eggs.

139. (4.) Callichrous pabo.

Silurus pabo, *Ham. Buch. Fish. Ganges*, pp. 153, 375, pl. 22, fig. 48.
Callichrous pabo, *Day, Fish. India*, p. 477, pl. cx, fig. 6 (see synon.).

B. xii. D. 5. P. 1/14. V. 9–10. A. 66–71 (3/63–66). C. 17.

Length of head 5 to $5\frac{1}{4}$, of caudal fin $8\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in the length of the head, $1\frac{1}{4}$ diameters from the end of snout, and $2\frac{1}{2}$ apart. The greatest width of the head equals its length behind the middle of the eyes. The lower jaw slightly in advance of the upper; the width of the gape of the mouth equals half the length of the head. *Barbels*—the maxillary reach the hind edge of the eye or a little further; the mandibular are fine and short. *Teeth*—in two short transverse patches rather distant from one another in the median line. *Fins*—the dorsal situated in the commencement of the second third of the length of the body. Pectoral fin as long as the head behind the angle of the mouth, the spine feebly serrated (entire in Burma) and half as long as the head. Ventral with ten rays in India, nine in Burma. *Colour*—silvery, with a badly marked shoulder-spot.

I found in Burma a variety of this fish, clouded all over with fine dark spots; it had black tips to the caudal lobes, and nine ventral rays.

Hab. Jumna and Ganges rivers, also Burma. Ham. Buchanan observed that it was termed at Patna *Támbŭlīyá páptá*, or *Callichrous* resembling a betel-leaf.

140. (5.) Callichrous macrophthalmus.

Pseudosilurus macrophthalmos, *Blyth, J. A. S. B.* xxix, 1860, p. 156.
Callichrous macrophthalmus, *Day, Fish. India*, p. 478, pl. cx, figs. 2 & 3 (see synon.).

B. xv. D. 4. P. 1/12–15. V. 8. A. 69–73 (2–3/66–70). C. 18.

Length of head $5\frac{1}{2}$ to 6, of caudal fin 6 to 7, height of body 5 to 6 in the total length. *Eyes*—diameter $3\frac{3}{4}$ to 4 in the length of head, 1 to $1\frac{1}{2}$ diameters from end of snout, and 2 to $2\frac{1}{4}$ apart. The greatest width of the head equals its length excluding the snout. Cleft of the mouth descends to opposite the upper third of the eye; the width of the gape equals one half to four ninths of the length of the head. *Barbels*—the maxillary pair reach to opposite the eighth or tenth anal ray; the mandibular are nearly one half the length of the head. *Teeth*—in a very narrow oblong patch on either side of the vomer, and not continuous in the median line. *Fins*—the dorsal half as high as the body, narrow (especially in Madras specimens), and situated in the commencement of the second third of the length of the fish excluding the snout. Ventrals equal $1\frac{1}{2}$ diameters of the eye. Anal not united to the caudal, the latter deeply forked. *Colour*—silvery, a dark round shoulder-spot over the middle of the pectoral spine;

this mark is very indistinct in Madras specimens, but exceedingly dark in those from Burma.

The only objection to uniting the Madras with the Assam and Burmese form is that the former has P. 1/12–13, the latter P. 1/15. The shoulder-spot is not so well marked, and the dorsal fin not so developed in the Madras variety. This fish is closely allied to *C. bimaculatus*, but has a larger eye, a narrow band of palatine teeth, much longer pectoral fins and maxillary barbels. The Burmese form (*C. notatus*) is more elongated.

Hab. Madras, Assam, and Burma.

141. (6.) Callichrous malabaricus.

Silurus malabaricus, *Cuv. & Val. H. N. Poiss.* xiv, p. 353.
Callichrous malabaricus, *Day, Fish. India*, p. 478, pl. cxi, fig. 1 (see synon.).

Kala gugli, Maráthi; *Mungee Wahlah*, Mal.

B. xv. D. 4. P. 1/13–14. V. 8. A. 61–69 (3/58–66). C. 17.

Length of head 5 to $5\frac{1}{2}$, of caudal fin 7, height of body 6 in the total length. *Eyes*—opposite the angle of the mouth, diameter $5\frac{1}{2}$ in the length of head, $1\frac{1}{4}$ diameters from the end of snout, and 3 apart. The greatest width of the head equals its length excluding the snout. Lower jaw strongly prominent. *Barbels*—the maxillary reach to above the commencement of the anal fin, the mandibular are short. *Teeth*—in an interrupted band across the vomer. *Fins*—dorsal narrow. Pectoral rounded, as long as the head excluding the snout; the spine strong, nearly one half as long as the head, and rather strongly serrated internally. A notch between the end of the anal and the base of the caudal, the last being deeply forked with the upper lobe the longer. *Colour*—of a deep greyish brown shot with purple, fin-membranes densely spotted with black.

Specimens captured to the south of Canara or in the Cochin district show the most anal rays, a more elongated body, and longer mandibular barbels.

Hab. Malabar coast of India as high as Canara. These fish reach 20 inches in length.

142. (7.) Callichrous pabda.

Silurus pabda, *Ham. Buch. Fish. Ganges*, pp. 150, 374, t. xxv, fig. 47.
Callichrous pabda, *Day, Fish. India*, p. 479, pl. cxi, figs. 2 & 3 (see synon.).

Pallu, Punj.; *Pabda*, Beng.

B. xii–xiv. D. 4–5. P. 1/11–13. V. 8. A. 54–60 (2/52–58). C. 18.

Length of head 5 to $5\frac{1}{4}$, of caudal fin 8, height of body 5 to $5\frac{1}{4}$ in the total length. *Eyes*—diameter 5 in the length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diameters from end of snout, and $2\frac{1}{2}$ to 3 apart. The greatest

width of the head equals its length excluding the snout. The width of the gape of the mouth equals half the length of the head. Lower jaw very prominent. *Barbels*—the maxillary reach the middle or end of the pectoral fin, the mandibular the hind edge of the orbit. *Teeth*—vomerine in two small oval patches, not confluent together. *Fins*—pectoral spine as long as the head behind the middle of the eyes, serrated internally, sometimes rather strongly, at other times feebly, or entirely smooth. Anal not confluent with the caudal. *Colour*—this varies considerably, usually silvery glossed with gold, having a dark shoulder-spot above the middle of the pectoral fin, and usually another close to the base of the tail. In some specimens the body is covered with brownish blotches. At Jubbulpore I took specimens having a dark band along the upper portion of the back, and a second along the lateral line, leaving a light line from the gill-opening to the upper portion of the caudal fin.

Hab. Punjab in the affluents of the Indus and along that river to its termination; at Hardwar where the Ganges emerges from the Himalayas and along its waters in the Gangetic provinces; also Orissa, Darjeeling, and the Brahmaputra in Assam.

14. Genus **AILIA**, Gray.

Branchiostegals eight. Gill-openings wide, the gill-membranes not confluent with the skin of the isthmus. Body elongated and strongly compressed. Head covered with thin skin. Eyes nearly or quite behind the angle of the mouth, and with adipose lids. Upper jaw slightly the longer. Nostrils patent, those on either side approximating, the anterior in front of the snout. Eight barbels. Villiform teeth in the jaws and in two minute patches on the vomer. No anterior dorsal, but a small adipose fin posteriorly. Pectoral with a spine. Ventral with six rays. Anal long (59–75 rays). Caudal forked. Air-bladder tubiform, lying across the body of an anterior vertebra, and externally protected by bone. No axillary pore.

Geographical Distribution. Sind, the larger rivers of the Punjab, N.W. Provinces, Bengal, Assam, and Orissa.

143. (1.) **Ailia coila.** (Fig. 58.)

Malapterurus coila, *Ham. Buch. Fish. Ganges*, pp. 158, 375.
Ailia coila, *Day, Fish. India*, p. 488, pl. cxiv, fig. 4 (see synon.).

Puttuli and *Bounse putti*, "Bamboo leaf," Ooriah; *Mungleeahnee*, Sind.; *Vella kalada*, Telugu; "*Kajoli*, Rangpur, *Basanguti*, Gorakpur, *Bätausi*, Bhagulpur," H. Buch.

B. viii. P. 1/14. V. 6. A. 59–75. C. 19.

Length of head 6 to 7, of caudal fin $5\frac{1}{2}$ to 8, height of body $5\frac{1}{4}$ to 6 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{3}{4}$ in the length of the head, $1\frac{1}{4}$ diameters from the end of snout, and 1 apart. The greatest width of the head equals its length excluding the snout;

the width of the gape of the mouth equals one third of the length of the head. Upper jaw the longer, and rather overhung by the snout. Cleft of the mouth reaching halfway to the orbit opposite the centre of the eye. *Barbels*—extend to the first one third or middle of the length of the fish excluding its caudal fin. *Teeth*—generic. *Fins*—pectoral spine slender and about as long as the

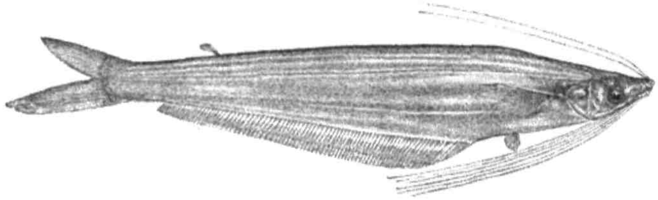

Fig. 58.—*Ailia coila.*

head. Ventral short. Anal with from 59 to 75 rays in my specimens, and most of the intermediate numbers may be found. Caudal forked. In many specimens the neural spines appear just above the skin along the back. *Colour*—silvery, some of the fins often stained grey at their margins. The caudal, especially in Orissa specimens, is commonly orange edged with black.

The fish is excellent eating and much esteemed as food.

Hab. From the Kistna and Orissa; throughout the Indus Jumna, and Ganges, from the hills to their terminations; also Assam. Attains at least 7 inches in length.

15. Genus **AILIICHTHYS**, Day.

Similar to *Ailia* except that the ventral fins are absent.

144. (1.) **Ailiichthys punctatus.** (Fig. 59.)

Ailiichthys punctata, *Day, P. Z. S.* 1871, p. 713; *and Fish. India*, p. 489, pl. cxiv, fig. 5.

Put-tas-si and *Put-tu-uh*, Punj.

P. 1/12. A. 76–90. C. 17.

Length of head 6 to 7, of caudal fin 6, height of body $5\frac{1}{2}$ in the total length. *Eyes*—situated more than half below the angle of the mouth, being partly on the lower side of the head, diameter four elevenths to one third of length of head, one half to two thirds of a diameter from end of snout, 1 diameter apart. Body compressed, upper profile of the head slightly concave. Width of the head equals its postorbital length. Width of the gape of the mouth equals one third of the length of the head. Upper jaw somewhat the longer, the cleft of the mouth only extends about halfway to the anterior margin of the eye, and to opposite its

centre. *Barbels*—subequal in length and extend to the middle of the length of the fish. *Teeth*—villiform in the jaws. *Fins*—adipose dorsal minute. Pectoral spine nearly as long as the head;

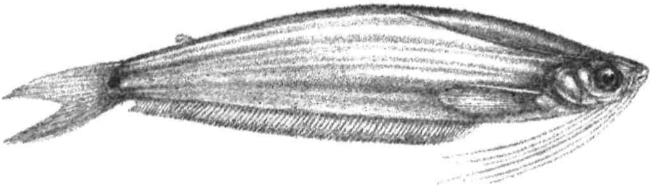

Fig. 59.—*Ailiichthhys punctatus*.

ventrals absent. Caudal forked, lower lobe the longer. *Colour*—silvery, upper surface of head nearly black, a large black spot before the base of the caudal fin.

Hab. Jumna below Delhi, also from the Indus in Sind, where I obtained numerous specimens up to 4 inches in length.

16. Genus **PSEUDEUTROPIUS**, Bleeker.

Syn. *Clupisoma*, Swainson; *Schilbeichthys*, Bleeker.

Branchiostegals from six to ten. Gill-openings wide, the membranes not confluent with the skin of the isthmus and rather deeply notched. Body elongated and compressed. Head covered with soft skin. Eyes large, with or without broad adipose lids, and situated behind as well as a little below the angle of the mouth, being usually partly on the inferior surface of the head. Upper jaw, as a rule, the longer. Nostrils patent, the posterior ones transverse and as near together as they are to the anterior pair. Barbels eight—one nasal pair, one maxillary and two mandibular pairs, these last commencing in a transverse line close to the hind margin of the lower lip. Teeth villiform on the jaws and palate. Dorsal fin short, with one spine and six to eight rays; a very small adipose dorsal which may be absorbed in the adult (*Schilbeichthys*); pectoral with a serrated spine; anal long, terminating at some distance from a forked caudal. Ventral with from 6 to 8 rays. Air-bladder rather small, somewhat heart-shaped, with a notch at its anterior edge, and closely attached to the front surfaces of the vertebræ. An axillary pore generally present.

Geographical Distribution. Fresh waters of Sind, India, Ceylon, and Burma to the Malay Archipelago, where according to Bleeker it appears to have a single representative.

Uses. These fishes are all excellent as food, but in some localities are to be avoided as they consume offal.

Synopsis of Indian Species.

A. 54. Nasal barbels reach the dorsal, maxillary barbels the anal fin; the mandibular are about as long as the head. Cleft of mouth to below first third of eye ...... 1. *P. goongwaree*, p. 137.
A. 43–52. Maxillary barbels reach middle of pectoral fin, the mandibular shorter than the head .... 2. *P. taakree*, p. 138.
A. 42–46. Snout projecting, and covered beneath with teeth which are entirely in advance of those of the lower jaw. The maxillary barbels reach the anal fin, the mandibular are as long as the head .... 3. *P. acutirostris*, p. 139.
A. 38–43. Maxillary barbels as long as head, the others shorter .... 4. *P. murius*, p. 139.
A. 35–37. Maxillary barbels reach the ventral fin, mandibular as long at the head. Teeth on the palate in two distinct patches .... 5. *P. sykesii*, p. 140.
A. 33–41. Maxillary barbels reach the anal fin, mandibular longer than the head. Dark bands along the body, and a spot at the base of the caudal .... 6. *P. atherinoides*, p. 141.
A. 29–36. Maxillary barbels reach the ventral fin, mandibular about as long as the head. Adipose dorsal absent in adults .... 7. *P. garua*, p. 141.

145. (1.) **Pseudeutropius goongwaree.** (Fig. 60.)

Hypophthalmus goongwaree, *Sykes, Tr. Z. S.* ii, p. 369, pl. 64, fig. 3.
Pseudeutropius goongwaree, *Day, Fish. India*, p. 471, pl. cix, fig. 3 (see synon.).

Nga myeen yeeng, Burmese.

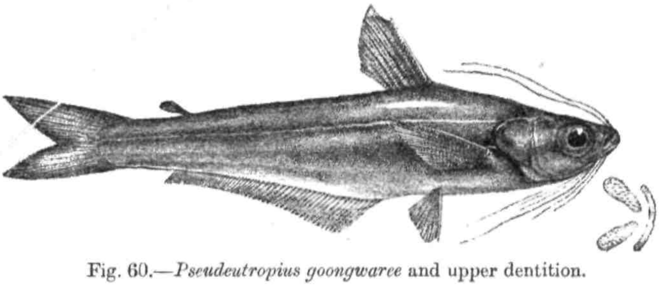

Fig. 60.—*Pseudeutropius goongwaree* and upper dentition.

B. vi. D. 1/7 | 0. P. 1/13. V. 6. A. 54 (3/51). C. 17.

Length of head 5, of caudal fin 5, height of body 5 in the total length. *Eyes*—with a very broad circular adipose lid, situated partially on the lower surface of the head, diameter $2\frac{3}{4}$ in the length of head, $\frac{3}{4}$ to 1 diameter from the end of snout, and 1 apart. The median longitudinal groove on the head reaches the base of the occipital process, which latter is narrow, especially at its base. Width of head rather above half its length. Upper

jaw the longer; width of gape of mouth equals the diameter of the eye; cleft extends to below first third of the eye. *Barbels*—the nasal pair reach the base of the dorsal fin, the maxillary the anal fin, and the mandibular are about as long as the head. *Teeth*—in a wide pyriform band, wider than those in the jaws; the vomerine and palatine groups touching, but the two vomerine patches having a short interspace between them. *Fins*—dorsal spine somewhat slender, nearly as long as the head and very finely serrated posteriorly. Pectoral spine slightly longer, stronger, and rather strongly denticulated internally. Ventral fin not quite half as long as the head, and under the centre of the dorsal fin. Caudal forked. Free portion of the tail rather higher at its base than it is long. *Colour*—silvery, darkest superiorly.

Hab. Rivers of the Deccan, Bengal, and Burma; attaining about a foot in length.

146. (2.) Pseudeutropius taakree.

Hypophthalmus taakree, *Sykes, Tr. Z. S.* ii, p. 369, pl. 64, fig. 4.
Pseudeutropius taakree, *Day, Fish. India*, p. 471, pl. cix, fig. 4 (see synon.).

Waidi and *Váyadi*, Maráthi; *Salava jella*, Telugu; *Nga than gyik*, Burmese.

B. vi. D. $\frac{1}{6-7}$ | 0. P. 1/10–11. V. 6. A. 43–52 $(\frac{3-4}{40-50})$. C. 17.

Length of head 6 to $6\frac{1}{3}$, of caudal fin 6, height of body 5 to 6 in the total length. *Eyes*—situated behind the angle of the mouth and partly on the under surface of the head, having broad circular adipose lids; diameter $2\frac{3}{4}$ to 3 in the length of the head, $\frac{2}{3}$ to 1 diameter from end of snout and 1 apart. The greatest width of the head equals half its length, the width of the gape of the mouth two fifths; the cleft of the mouth extends to opposite the middle of the front edge of the eye. Occipital process long and slender, scarcely reaching the basal bone of the dorsal fin. Median longitudinal groove on the head shallow and reaching to the occipital process. *Barbels*—the nasal half as long as the head, the maxillaries reach the anal, whilst the mandibular are a little longer than the head. *Teeth*—the vomerine and palatine in a distinct patch. *Fins*—dorsal spine smooth anteriorly, serrated posteriorly, as long as the head without the snout. Pectoral spine stronger, serrated internally and almost as long as the head. Ventral rather above half as long as the head and reaching the anal. Free portion of the tail about as high at its base as it is long. *Colour*—silvery, with a gloss of green along the back; caudal stained with grey at its edges.

I have obtained in Burma, as high as Mandalay, specimens which I am unable to separate from this species, except that in some the pectoral spine is slightly shorter, in others the adipose fin is almost or quite absent.

Hab. Poona, the Deccan, the rivers Kistna and Jumna. Attains upwards of a foot and a half in length, and is good eating.

147. (3.) Pseudeutropius acutirostris.

Pseudeutropius acutirostris, *Day, P. Z. S.* 1869, p. 618; *and Fish. India*, p. 472, pl. cix, fig. 1 (see synon.)

B. vi. D. 1/6 | 0. P. 1/7. V. 6. A. 42–46 (2/40–44). C. 17.

Length of head $4\frac{2}{3}$ to 5, of caudal fin 5, height of body 5 in the total length. *Eyes*—without adipose lids, situated behind the cleft of the mouth, diameter one third of the length of the head, one diameter from the end of snout, and also apart. The greatest width of the head equals half its length. Upper surface of the head flat and rugose. Upper jaw elongated, and projecting considerably beyond the lower. The median longitudinal groove on the head reaches the base of the occipital process, which is narrow and two sevenths as wide at its base as it is long. *Barbels*—the nasal rather longer than the head, the maxillary reach the base of the anal fin, the mandibular as long as the head. *Teeth*—the whole under surface of the snout toothed, the premaxillaries being entirely in advance of the lower jaw, in two minute patches on the vomer, and of the same character on the palatines, the latter not continuous with those on the vomer. *Fins*—dorsal spine as long as the head behind the angle of the mouth, finely serrated posteriorly. Pectoral spine strong, rough externally, and with about ten strong teeth internally; it is as long as the head excluding the snout. Ventral arising somewhat behind the base of the dorsal fin; caudal deeply forked. *Colour*—silvery, a black spot on the occiput, and a black blotch at the base of the dorsal fin.

Hab. The Irrawaddi and other large Burmese rivers. It does not appear to attain a large size.

148. (4.) Pseudeutropius murius.

Pimelodus murius, *Ham. Buch. Fish. Ganges*, pp. 195, 378.
Pseudeutropius murius, *Day, P. Z. S.* 1869, p. 306; *and Fish. India*, p. 472, pl. cviii, fig. 6 (see synon.).

Muri-vacha, Ooriah and Bengali; *Motusi*, Beng.; *Butchua*, Hind.; *Ke-raad*, Punj.; *Chhotkâ váchoyá*, of the Kusi (H. B.).

B. v. D. 1/7 | 0. P. 1/10. V. 6. A. 38–43 (3/35–40). C. 17.

Length of head $5\frac{1}{2}$ to 6, of caudal fin $5\frac{1}{2}$ to 6, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—lateral and very slightly on the lower surface of the head; each with a broad, circular, adipose lid, diameter 3 to $3\frac{3}{4}$ in the length of head, $\frac{3}{4}$ of a diameter from end of snout, and 1 apart. The greatest width of the head is rather above two thirds of its length. Jaws compressed, the upper slightly the longer, the cleft reaches nearly or quite to below the front edge of the eye; the width of the gape equals one third of the length of the head. The median longitudinal groove on the head extends to the end of the occipital process,

which is narrow, short, half as wide at its base as it is long, and with a long interspace between it and the basal bone of the dorsal fin. *Barbels*—the nasal reach to a short distance behind the posterior edge of the orbit; the maxillary to the base of the pectoral fin, whilst the two mandibular pairs are a little longer than the head. *Teeth*—on the vomer and palate form an almost uninterrupted semilunar band. *Fins*—dorsal spine nearly as long as the first ray, or as the head excluding the snout, weak, very finely serrated in front, more coarsely behind. Pectoral spine weak, nearly or quite as long as the head, rough externally, serrated internally. Ventral small, one third as long as the head. Caudal deeply forked. Caudal peduncle as long as deep at its base. *Colour*—silvery, lightest along the sides and below; dorsal, pectoral, and caudal fins darkest at their margins.

In the form called *P. megalops* the maxillary barbels extend to beyond the origin of the anal fin, but I do not see any other difference.

Hab. Rivers of Sind, Orissa, the Jumna, and rivers of Bengal and Assam. Attaining about 6 or 8 inches in length.

149. (5.) Pseudeutropius sykesii.

Schilbe sykesii, *Jerdon, Mad. Jour. L. Sc.* xv, 1849, p. 335.
Pseudeutropius sykesii, *Day, Fish. India*, p. 473, pl. cix, fig. 5 (see synon.).

Nah-kelletee, Tam.

B. viii–ix. D. 1/7 | 0. P. 1/9. V. 6. A. 35–37 (3/32–34). C. 17.

Length of head 6, of caudal fin 6, height of body 6 in the total length. *Eyes*—diameter 3 to 3¼ in length of head, 1 diameter from end of snout, and 1¼ apart. Head rather higher than wide, its greatest width equals its length excluding the snout. The angle of the mouth is on a level with the lower edge of the orbit. Upper jaw slightly the longer; posteriorly it reaches two thirds of the distance between the snout and front edge of the orbit. The median longitudinal groove on the upper surface of the head reaches to the base of the occipital process, which is narrow. *Barbels*—the nasal pair reach to the front edge of the orbit, the maxillary pair to the end of the pectoral or middle of the ventral; the mandibular are as long as, or a little longer than the head. *Teeth*—those on the palate in two distinct patches. *Fins*—dorsal spine slender, as long as the head excluding the snout, and finely serrated posteriorly; adipose fin small. Pectoral spine stronger and slightly longer than that of the dorsal, smooth externally, denticulated internally with about twenty-two teeth. Ventral commences just behind the vertical from the last dorsal ray; caudal forked, lower lobe slightly the longer. *Colour*—bluish silvery along the back, becoming silvery white on the sides and below. Dorsal and caudal grey, the other fins white.

Hab. Western coast of India in fresh water; attaining about 6 inches in length.

150. (6.) Pseudeutropius atherinoides.

Silurus atherinoides, *Bloch, Ich.* t. 371, fig. 1.
Pseudeutropius atherinoides, *Day, Fish. India,* p. 473, pl. cix, fig. 2 (see synon.).

Put-tul, and *Chel-lee,* Punj.; *Ah-hee,* Sind.; *Put-tah-re,* N.W. Prov.; *Akku-jella,* Tel.; *Battuli* and *Bi-potassi,* Ooriah; *Boh-du-ah* (*Pátási,* and *Doyá,* H. B.), Assam.

B. vi. D. 1/5-6 | 0. P. 1/7. V. 6. A. 33-41 (3/30-38). C. 17.

Length of head 5 to $5\frac{1}{2}$, of caudal fin 5, height of body $4\frac{1}{2}$ to $5\frac{1}{2}$ in the total length. *Eyes*—with free orbital margins, no adipose lids, situated partially on the lower surface of the head; diameter $2\frac{1}{2}$ to 3 in the length of head, and about half a diameter from end of snout. The greatest width of the head equals two thirds of its length. Upper jaw a little the longer. The median longitudinal groove on the head broad, shallow, and reaching to the base of the occipital process, which is four times as long as broad at its base and extends to the basal bone of the dorsal fin. *Barbels*—the nasal slightly longer than the head, the maxillary reach the base of the anal (in some Madras specimens only to the ventral) fin, the mandibular pair are rather longer than the head. *Teeth*—in the premaxillaries usually anterior to those in the mandibles; in a narrow, uninterrupted, crescentic band across the palate. *Fins*—dorsal spine two thirds as long as the head, anteriorly rugose, finely serrated posteriorly. Pectoral spine rather longer and stronger than that of the dorsal, with about ten denticulations internally. Ventral half as long as the head. Caudal deeply forked. *Colour*—silvery, greenish along the back, and with three or four bands along the sides formed by black spots. Occiput and anterior portion of dorsal fin dark-coloured.

Hab. Throughout Sind, India (excluding the western coast), and Assam; rarely attaining to above 4 or 5 inches in length. The form called *P. urua* is said to come from rivers and ponds in the northern parts of Bengal.

151. (7.) Pseudeutropius garua.

Silurus garua, *Ham. Buch. Fish. Ganges,* pp. 156, 375, pl. 21, fig. 50.
Pseudeutropius garua, *Day, Fish. India,* p. 474, pl. cix, fig. 6 (see synon.).

Punia buchua, Ooriah; *Puttosi,* Beng.; *Buchua,* Hind.; *Dhon-ga-nu,* Sind.; (*Kocha,* H. B.).

D. vi. D. 1/7. P. 1/11. V. 6. A. 29-36 (3/26-33). C. 17.

Length of head $5\frac{1}{2}$ to $6\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $5\frac{1}{2}$ to 7 in the total length. *Eyes*—situated partly on the lower surface of the head, having a broad, circular, adipose lid; diameter $3\frac{1}{2}$ to 4 in the length of the head, $1\frac{1}{4}$ diameters from the end of snout, and $2\frac{1}{2}$ apart. The greatest width of the head equals its length excluding

the snout. Upper jaw the longer, the width of the gape of the mouth is two fifths the length of the head. Occipital process about four times as long as it is wide at its base, and not quite reaching the basal bone. *Barbels*—nasal from one third to one half as long as the head; the maxillary extend to the middle or end of the ventral fin, the two mandibular pairs are about as long as the head. *Teeth*—in a semilunar band across the palate, those of the vomer contiguous to those of the palatines, and each patch being semicircular internally: sometimes the two vomerine patches have an interspace between them. *Fins*—dorsal spine rather slender, rugose anteriorly and feebly serrated posteriorly, as long as the head behind the nostrils, while the pectoral is of equal length or a little longer, stronger, and denticulated internally. The adipose dorsal generally only exists in the immature, and becomes almost imperceptible in the adult: as its non-existence forms the chief distinction of the genus *Schilbeichthys* from that of *Pseudeutropius*, whilst its absence is merely the result of age, I have not adopted the former designation. Lower caudal lobe the longer. *Air-bladder*—small, somewhat heart-shaped, and closely attached to the anterior surface of the front vertebræ. *Colour*—silvery, fins stained with grey.

Hab. Found generally throughout the larger rivers of Sind, India, Assam, and Burma. Attains upwards of two feet in length.

17. Genus **PANGASIUS**, Cuvier and Valenciennes.

Syn. *Pseudopangasius* and *Helicophagus*, Bleeker.

Branchiostegals from about seven to twelve. Gill-openings wide, the membranes not confluent with the skin of the isthmus and rather deeply notched. Upper jaw the longer. Eye with a free orbital margin. Nostrils at some distance apart, both patent, the anterior situated in front, or on the upper edge, of the snout. Four slender barbels, one pair maxillary and a pair behind the chin. Teeth villiform, intermixed with conical ones in the jaws; those in the vomer, if present, distinct from those on the palatines. Dorsal fin inserted in front of ventral and with one spine and seven rays; adipose fin short. Ventral with six rays. Pectoral with a spine. Anal rather elongate (29 to 39 rays), not confluent with the caudal. Air-bladder in the abdominal cavity, and not enclosed in bone. One or more axillary pores.

Geographical Distribution. Large rivers and estuaries of India and Burma to the Malay Archipelago.

152. (1.) **Pangasius buchanani.** (Fig. 61.)

Pimelodus pangasius, *Ham. Buch. Fish. Ganges*, pp. 163, 376, pl. 33, fig. 52.

Pangasius buchanani, *Cuv. & Val. H. N. Poiss.* xv, p. 45, pl. 425; *Day, Fish. India*, p. 470, pl. cviii, fig. 5 (see synon.).

Jellum, Ooriah; *Coola Kellette*, Tamil; *Nga dan*, Burmese.

B. ix–x. D. 1/7 | 0. P. 1/12. V. 6. A. 31–34 (4–5/27–29). C. 19.

Length of head $5\frac{1}{2}$ to 6, of caudal fin 5 to $5\frac{1}{4}$, height of body 4 to 5 in the total length. *Eyes*—partly on the lower surface of the head, and rather nearer the snout than the occiput, the width of the interorbital space equalling the length of the head excluding the snout. The greatest width of the head equals its length behind the angle of the mouth. Upper jaw the longer; width of the gape of the mouth equals three sevenths of the length of the head, its cleft reaches to below the hind nostril, and is opposite the centre of the front edge of the eye. Upper surface of the head smooth in small specimens, rather lineated in large ones, especially along the occipital process, which is from $2\frac{1}{2}$ to 3

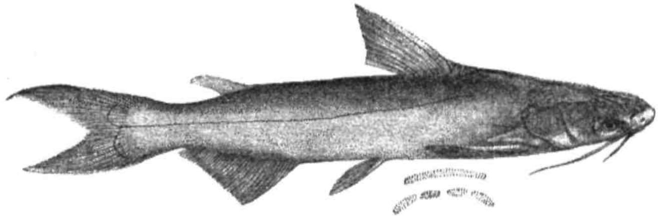

Fig. 61.—*Pangasius buchanani* and upper dentition.

times as long as wide at its base. *Barbels*—the maxillary reach the base of the pectoral fin; the mandibular are half as long as the head. *Teeth*—on the palate in a crescentic row, the vomerine patches being either distinct from or just confluent with those on the palate. *Fins*—dorsal spine of moderate strength, as long as the head behind the angle of the mouth, slightly serrated anteriorly, in its entire length posteriorly. Pectoral spine rather stronger than that of the dorsal, in some specimens of the same length; in others as long as the head, denticulated internally. Caudal deeply forked. *Colour*—silvery, darkest along the back and glossed with purple on the sides; cheeks and under surface of the head shot with gold. *Air-bladder*—large, its anterior portion occupies about half the length of the abdominal cavity, and is then divided by a constriction from the second portion, which is narrowed and divides into two small continuations, one of which extends on either side amongst the muscles covering the hæmal spines, as far as to above the middle of the anal fin. The anterior portion of the air-bladder has a large pyramidal and cellular cavity, the base of which is anterior; on either side of this cellular cavity is a pyriform smooth chamber, the two communicating anteriorly. The remainder of the air-bladder is cellular or, rather, furnished with valvular-formed folds.

Hab. Large rivers and estuaries of India, Assam, Burma, and perhaps the Malay Archipelago. This species attains upwards of four feet in length, and is a foul feeder.

18. Genus **SILUNDIA**, Cuvier and Valenciennes.

Branchiostegals eleven to twelve. Gill-openings wide, the gill-membranes overlapping, but not confluent with the skin of the isthmus. Body elongated and compressed. Head covered with soft skin. Eyes lateral, with narrow adipose lids. Mouth rather wide, not cleft to so far as the eyes; lower jaw the longer. Nostrils, those on either side approximating, the anterior pair in front of the snout and a little external to the posterior pair. A pair of maxillary and sometimes also a pair of mandibular barbels. Villiform teeth in the jaws, and in an uninterrupted band on the palate. First dorsal fin with one spine and seven rays; the adipose short. Anal long (40–50 rays). Ventral with six rays, placed below or just behind the adipose dorsal. Air-bladder kidney-shaped, convex anteriorly, lying across the body of an anterior vertebra, from which it is separated by the aorta, having its lateral margins protected by bone. An axillary pore.

Geographical Distribution. Throughout the larger rivers of India and Burma.

Synopsis of Indian Species.

A. 44–50. Maxillary and mandibular barbels .... 1. *S. sykesii*, p. 144.
A. 40–46. A pair of short maxillary barbels only. 2. *S. gangetica*, p. 145.

153. (1.) Silundia sykesii.

Silundia sykesii, *Day, Jour. L. S. Zool.* xii, p. 569; *and Fish. India*, p. 487, pl. cxiv, fig. 2 (see synon.).

Wal-la-ke kel-le-tee (slippery siluroid) and *Poo-nat-tee*, Tam.; *Wan-jou*, Tel.

B. xii. D. 1/7 | 0. P. 1/12. V. 6. A. 44–50 (2–3/42–47). C. 19.

Length of head $5\frac{1}{4}$, of caudal fin $4\frac{2}{3}$, height of body $5\frac{3}{4}$ in the total length. *Eyes*—with a narrow, free, adipose lid; diameter $3\frac{1}{2}$ in the length of the head, 1 diameter from the end of snout, and $1\frac{1}{3}$ apart. The greatest width of the head equals its length behind the middle of the eyes; lower jaw the longer, curved upwards in the middle; snout rather broad; the width of the gape of the mouth equals four elevenths of the length of the head. *Barbels*—the maxillary pair reach the opercle or even the base of the pectoral fin; the mandibular pair equal one diameter of the eye in length. *Teeth*—villiform in the jaws, in a crescentic band across the palate. *Fins*—dorsal spine weak, roughened anteriorly, finely serrated posteriorly and as long as the head excluding the snout; pectoral spine stronger, as long as the head behind the angle of the mouth, and reaching to above the ventral. Ventral arising behind the vertical from the last dorsal ray, and reaching to the anal. Caudal forked, the lower lobe rather the longer. Free portion of the tail nearly as high as long. *Colour*—bluish superiorly,

becoming white on the sides and beneath, the fins stained externally with grey.

Sykes says his *Ageneiosus childreni* is termed *Purree*, Mahr., and *Sillun* in the Deccan, that it is *without cirri*, and also that the first bony ray is "serrated on the anterior edge," this being also shown in the figure. The long maxillary barbels of this species serve to distinguish it from *S. gangetica*.

Hab. Rivers of the Deccan and the Kistna and Godavery to their terminations.

154 (2.) Silundia gangetica. (Fig. 62.)

Pimelodus silondia, *Ham. Buch. Fish. Ganges*, pp. 160, 375, pl. 7, fig. 50.

Silundia gangetica, *Cuv. & Val. H. N. Poiss.* xv, p. 49, pl. 426; *Day, Fish. India*, p. 488, pl. cxiv, fig. 3 (see synon.).

Silond, Punj.; *Ji-lung* and *Silond*, Ooriah and Bengali; *Wanjou*, Telugu; *Poonatté* or *Wallaké kelletti* ("slippery siluroid"), Tamil; *Nga mrang*, Arracan; *Basa* or *Bacha*, Chittagong; *Nga mee nyeeng*, Burm.

B. xi–xii. D. 1/7 | 0. P. 1/11–13. V. 6. A. 40–46 (4/36–44). C. 17.

Length of head $5\frac{1}{4}$, of caudal fin $5\frac{1}{2}$ to 6, height of body 5 to $5\frac{1}{4}$ in the total length. *Eyes*—with narrow anterior and posterior adipose lids; diameter 4 to $4\frac{1}{2}$ in the length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diameters from the end of snout, and 2 apart. The width of the head equals its length excluding the snout, whilst its height is rather less. Lower jaw the longer, snout rather broad, the width of the gape of the mouth exceeding half the length of the head. *Barbels*—a pair of minute maxillary, but no mandibular ones. *Teeth*—in the jaws villiform, and in a crescentic band across the

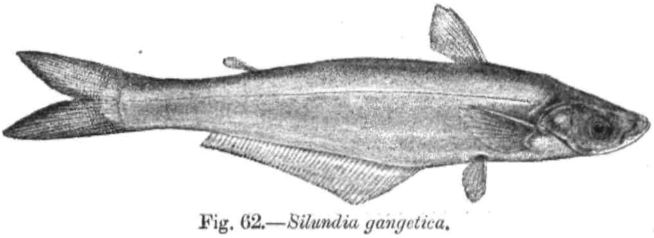

Fig. 62.—*Silundia gangetica.*

palate. *Fins*—dorsal spine rather weak, as long as the head behind the middle of the eye, anteriorly smooth or rugose, posteriorly finely serrated in its upper portion. Pectoral spine stronger, as long as head without the snout, and serrated internally. Ventral fin arising under the posterior dorsal rays, and nearly reaching the anal. *Air-bladder*—small, with its lateral edges protected by a short osseous process from either side of the vertebra, but it cannot be said to be enclosed in bone. The air-bladder itself, when opened, is found to consist of two oval chambers,

having a communicating canal, and in the young is almost surrounded by high osseous sides. *Colour*—bluish along the back, becoming silvery on the sides, fins stained with grey.

Hab. Estuaries of India and Burma, ascending the larger rivers nearly to their sources. *S. gangetica* attains 6 feet or more in length, and is called "a shark" by the natives. It is very voracious.

19. Genus **MACRONES**, Duméril.

Syn. *Bagrus*, pt., Cuv. & Val.; *Hypselobagrus, Hemibagrus, Pseudobagrus,* and *Aspidobagrus*, Bleeker.

Branchiostegals from six to twelve. Mouth terminal, transverse. Upper jaw generally the longer. Gill-openings wide, the gill-membranes overlapping the isthmus and being separate to the chin. Eyes with free circular lids. Barbels eight—one nasal, one maxillary, and two mandibular pairs. A distinct and separate interneural shield on the nape, closely connected to the basal bone of the dorsal fin; or no such shield. Villiform teeth in the jaws, and in a more or less uninterrupted curved band across the palate. Rayed dorsal fin with one spine and seven rays; adipose dorsal of varying length; pectoral with a strong serrated spine; anal short or of moderate length; ventral with six rays; caudal forked. Air-bladder of moderate or large size, attached to the under surface of the bodies of the anterior vertebræ. An axillary pore generally present.

The ova of these fishes are small, consequently very different to those of their marine relatives, *Arius* and its allied genera.

Geographical Distribution. These fishes extend through most parts of Asia, and are numerous in the fresh waters of India and Ceylon, one species (*M. gulio*) often being captured in the sea.

Uses. Employed as food by the poorer natives, but of inferior quality and rather insipid.

Synopsis of Indian Species.

A. 26–28. Golden, with a large black shoulder-spot	1. *M. chryseus*, p. 148.
A. 12–13. Maxillary barbels reach caudal fin. A black spot on adipose dorsal fin	2. *M. aor*, p. 149.
A. 11–12. Maxillary barbels reach hind edge of first dorsal fin............	3. *M. seenghala*, p. 150.
A. 12. Maxillary barbels reach front edge of eye. A dark shoulder-spot, another on the adipose dorsal; body with indistinct cross bands........	4. *M. blythii*, p. 151.
A. 12–15. Occipital process half longer than wide at its base, a long interspace between it and basal bone of dorsal fin. Length of base of adipose dorsal equal to half that of the interspace between the two dorsal fins..	5. *M. gulio*, p. 151.

A. 11–13. Upper surface of the head almost smooth. Occipital process very narrow, a long interspace between it and basal bone. Brown, with some black spots along the sides .... 6. *M. punctatus*, p. 153.

A. 11–13. Upper surface of the head roughened. Occipital process short, with a long interspace between it and the basal bone. Brown with some black spots along the sides .. 7. *M. corsula*, p. 153.

A. 12. Occipital process short, with a long interspace between it and the basal bone. Dorsal spine smooth, weak, articulated in its upper three fourths .... 8. *M. microphthalmus*, p. 154.

A. 11–13. Occipital process reaches basal bone. Maxillary barbels reach caudal fin. Adipose dorsal long, commencing just behind the rayed fin. Dorsal spine entire. Silvery, often with a black spot at base of dorsal spine, and fins stained with dark .... 9. *M. cavasius*, p. 155.

A. 11–13. Median groove on head reaches base of occipital process, which latter reaches the basal bone. Golden, with a black shoulder-spot and about five longitudinal dark bands .... 10. *M. tengara*, p. 156.

A. 11–13. Eye 3 to 3½ in length of head; occipital process reaches basal bone. Maxillary barbels reach middle of anal fin. Base of adipose dorsal as long as that of the rayed fin. Dark spot anteriorly at base of dorsal fin .... 11. *M. oculatus*, p. 156.

A. 9–12. Median groove on head does not reach the base of the occipital process, which latter reaches the basal bone........................ 12. *M. vittatus*, p. 157.

A. 11–12. Maxillary barbels reach anal fin. Purplish black, with some white spots .... 13. *M. leucophasis*, p. 158.

A. 12. Head 5 in the total length. Median groove on head does not reach occipital process, which last extends to the basal bone. Maxillary barbels reach anal fin. A dark shoulder-mark, a light band along the body, and dark spot at base of caudal .... 14. *M. montanus*, p. 159.

A. 9–10. Head 4⅔ in the total length. Median groove on head does not reach occipital process, which last does not quite reach the basal bone.

Maxillary barbels reach middle of anal fin. A large pre-anal papilla. A dark shoulder-mark............ 15. *M. keletius*, p. 160.

A. 10–11. Head $4\frac{3}{4}$ to $5\frac{1}{2}$ in the total length. Median groove on the head does not reach base of occipital process, which last has a long interspace between it and the basal bone. Maxillary barbels reach middle or end of ventral fin. A dark shoulder-spot, another at base of caudal fin. .... 16. *M. malabaricus*, p. 160.

A. 11. Head $5\frac{1}{2}$ in the total length. Median groove on the head almost reaches the base of the occipital process, which last reaches the basal bone. Maxillary barbels reach end of ventral fin. A dark blotch at base of caudal fin................ 17. *M. armatus*, p. 161.

A. 9–10. Head $5\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. Median groove on the head reaches the base of the occipital process, which last reaches the basal bone. Maxillary barbels reach the anal fin. Two light longitudinal bands, and sometimes a dark shoulder-spot........................ 18. *M. bleekeri*, p. 162.

155. (1.) Macrones chryseus. (Fig. 63.)

Pseudobagrus chryseus, *Day, Fish. Malabar*, p. 185, pl. xiii, fig. 2.
Macrones chryseus, *Day, Fish. India*, p. 443, pl. xcix, fig 3.

Mungil yata, Mal.; *Neela katurnee*, Hind.

B. x. D. 1/7 | 0. P. 1/6. V. 6. A. 26–28. C. 17–19.

Length of head $4\frac{1}{3}$ to $4\frac{2}{3}$, of caudal fin 5, height of body 5 in the

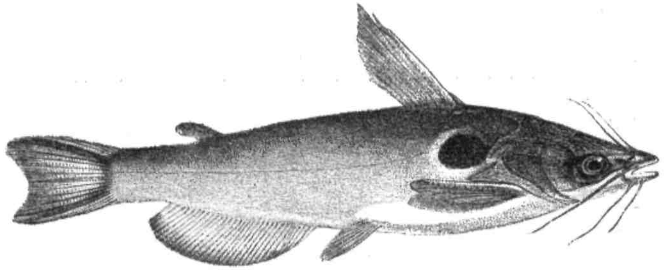

Fig. 63.—*Macrones chryseus.*

total length. *Eyes*—diameter 4 to 5 in the length of head, $1\frac{1}{2}$ diameters from the end of snout, and 2 to $2\frac{1}{2}$ apart. Greatest width of the head equals four fifths of its length. Upper jaw slightly the longer. Width of gape of mouth nearly equal to half the length

of the head. Upper surface of head, opercles, and humeral process with smooth ridges. Occipital process twice as long as wide at its base, no interspace between it and the basal bone. The superior longitudinal groove on the head shallow, reaching to opposite the hind edge of the eye. *Barbels*—the nasal rather above half the length of the head, the maxillary slightly longer, the external mandibular reach the base of the pectoral fin, the internal pair are one fourth shorter. *Teeth*—in a narrow uninterrupted semilunar band across the palate. *Fins*—dorsal spine as long as the head behind the middle of the eyes, strong, with about ten denticulations posteriorly, and three or four anteriorly near its summit; it ends in a soft prolongation; adipose fin short, commencing over the last fourth of the anal. Pectoral reaches the ventral; pectoral spine stronger than that of the dorsal and as long as the head excluding the snout, serrated externally and with 16 or 18 strong teeth internally. Ventral rather above half as long as the pectoral and reaching the anal: base of anal equal to the length of the head; the fin is highest anteriorly. Caudal slightly or deeply lunated or even forked. Free portion of tail rather higher than long. *Colour*—back greenish yellow, sides golden; a large round black mark on the shoulder surrounded by a light yellow ring. Dorsal and anal fins yellowish orange, stained with darker at their margins. Caudal yellow, with a black base and dark edges.

Hab. Rivers in Canara and Malabar, preferring the deepest pools. Longest specimen obtained 8 inches, but double that size is said to be attained. Wounds from the spines of this fish are deemed venomous by the natives.

156. (2.) Macrones aor.

Pimelodus aor, *Ham. Buch. Fish. Ganges*, pp. 205, 379, pl. 20, fig. 68.
Macrones aor, *Day, Fish. India,* p. 444.

Mukul-jellah, Tel.; *Cumboo kelletee*, Tam.; *Nga-joung* and *Nga uéy*, Burm.; *Seengala* and *Sang-go-ah*, Punj.; *Singharee*, Sind.; *Alli* or *Addi*, Ooriah.

B. xii. D. 1/7 | 0. P. 1/9–10. V. 6. A. 12–13 (3–4/9). C. 17.

Length of head $4\frac{1}{2}$ to 5, of caudal fin 4, height of body 6 in the total length. *Eyes*—transversely oval, diameter 5 to 8 in the length of the head, $2\frac{1}{2}$ to 3 diameters from the end of snout, and $1\frac{2}{3}$ to 2 apart. Snout broad, depressed, the width of the gape being equal to from two fifths to three sevenths of the length of the head, while the cleft does not extend halfway to the orbit. The upper jaw the longer. Width of the head three fifths of its length, its upper surface rugose in tuberculated ridges. Occipital process not extending halfway to the basal bone of the dorsal, while an intermediate interneural shield exists, which is usually wider than the occipital process. The width of this bone is subject to great variation: thus in some old specimens it is only twice as long as broad, whilst in others and in some immature it is four times

as long as wide. The longitudinal furrow on the head extends to the base of the occipital process. *Barbels*—the maxillary extend to, or even beyond, the base of the caudal fin; the nasal halfway to the orbit; the outer mandibular to the base of the pectoral, and the inner two-thirds of that distance. *Teeth*—in an uninterrupted semilunar band across the palate. *Fins*—dorsal spine rather weak, nearly or quite as long as the head (in the young occasionally shorter), finely serrated posteriorly. Pectoral as long as the head excluding the snout, and reaching four sevenths of the distance to the ventral; pectoral spine stronger than dorsal but shorter, being from one half to three fifths of the length of the head, it is rugose or finely serrated externally and denticulated internally. The adipose dorsal commences above the last third or end of the ventral, and its base equals about that of the rayed fin or even a little more, whilst the extent of the interspace between the two fins equals half the length of that of the rayed dorsal fin. Ventral does not reach the anal. Caudal with deeply pointed lobes, the three outer rays in the upper lobe being produced. *Air-bladder*—large and pyriform. *Colour*—bluish leaden superiorly, becoming white beneath; fins yellowish, stained with dark externally in both the dorsal and caudal. A black spot about equal to the diameter of the eye on the posterior and inferior portion of the soft dorsal.

Hab. Throughout Sind and India to Burma. Said to attain 6 feet; a specimen in Calcutta is 3 feet long.

157. (3.) Macrones seenghala.

Platystoma seenghala, *Sykes, Tr. Z. S.* ii, p. 371, pl. 65, fig. 2.
Macrones seenghala, *Day, Fish. India*, p. 444, pl. xcix, fig. 1 (see synon.).

Teng-ga-ra, Punj.; *Muti-jellah*, *Seenghala*, and *Shengal*, Telugu.

B. xii. D. 1/7 | 0. P. 1/9. V. 6. A. 11–12 (3/8–9). C. 19–21.

Length of head $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $7\frac{1}{2}$ to 8 in the total length. *Eyes*—diameter 7 to 8 in the length of head, 2 to $2\frac{1}{2}$ diameters from the end of snout, and $1\frac{1}{2}$ to 2 apart. The greatest width of the head equals one half to four ninths of its length; snout spatulate; upper jaw rather the longer; the width of the gape equals one third of the length of the head, the cleft shallow. Upper surface of the head granulated in ridges, its median longitudinal groove reaches the base of the occipital process, which is twice as long as wide at its base, between its posterior extremity and the basal bone of the dorsal fin is a separate interneural shield from four times as long as broad in the young, to twice as long in the adult. *Barbels*—the maxillary extend to the middle or just beyond the hind margin of the dorsal fin, the nasal to opposite the middle of the orbit, the external mandibular to the base of the pectoral, whilst the internal are one third shorter. *Teeth*—on the palate in an uninterrupted crescentic band. *Fins*—dorsal one

third to one half higher than the body, its spine rather weak, anteriorly rugose, indistinctly serrated posteriorly, and as long as the head excluding the snout; the length of the base of the adipose dorsal equals or exceeds that of the rayed fin, while the intermediate distance is of the same length. Pectoral extends rather above halfway to the ventral; pectoral spine is stronger than dorsal and half as long as the head, roughened externally, denticulated internally. Ventral extending two thirds of the distance to the anal. Caudal deeply forked, upper lobe the longer. *Air-bladder*—large, pear-shaped, and not enclosed in bone. *Colour*—brownish along the back, silvery on the sides and beneath, a round black spot at the posterior end of the base of the adipose dorsal fin.

Very closely allied to *M. aor*, and chiefly distinguished by its much shorter maxillary barbels.

Hab. The Indus, salt-ranges of the Punjab, Jumna, and Ganges certainly as low as Delhi, also the Deccan, Kistna river to its termination, and Assam. This species attains a considerable size.

158. (4.) Macrones blythii.

Batasio affinis, *Blyth, J. A. S. B.* xxix, 1860, p. 150 (*not* Bagrus affinis, *Jerdon*, 1849).

Macrones blythii, *Day, Fish. India*, p. 445 (see synon.).

D. 1/7 | 0. P. 1/7. V. 6. A. 12 (3/9). C. 17.

Length of head nearly 5, of pectoral fin 6, of caudal 6, height of body 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout and $1\frac{1}{4}$ apart. Snout projecting. Median longitudinal groove on head indistinct, but reaching the base of the occipital process, which is narrow, twice as long as wide at its base, and separated from the basal bone of the dorsal fin by an interneural shield. *Barbels*—the maxillary, which are the longest, only reach the anterior margin of the orbit. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal spine moderately strong, slightly serrated posteriorly in its upper fourth, and rather above half the length of the head. Pectoral spine slightly longer and stronger than that of the dorsal, and denticulated internally. Adipose dorsal commencing not far from the hind edge of the first dorsal, while the base is a little longer than that of the anal. Caudal forked, the lobes of nearly equal length. *Colour*—a dark spot on the shoulder, a second on the base of the adipose dorsal fin; body with indistinct cross bands.

Hab. Tenasserim provinces, whence one specimen 3·5 inches long was sent to the Calcutta Museum.

159. (5.) Macrones gulio. (Fig. 64.)

Pimelodus gulio, *Ham. Buch. Fish. Ganges*, pp. 201, 379, pl. 23, fig. 66.

Macrones gulio, *Day, Fish. India*, p. 445, pl. xcix, fig. 2 (see synon.).

Nuna tenggara, Beng.; *Nga jerung*, Arracan.

B. ix. D. 1/7 | 0. P. 1/8–9. V. 6. A. 12–15 (3–4/9–11). C. 17.

Length of head $4\frac{1}{4}$ to $4\frac{2}{3}$, of caudal fin $4\frac{1}{2}$, height of body 5 to $5\frac{3}{4}$ in the total length. *Eyes*—diameter 5 to 6 in the length of head, $1\frac{1}{2}$ diameters from the end of snout, and 2 diameters apart. Snout broad and slightly depressed, upper jaw somewhat the longer. Greatest width of head equal to its length excluding the snout, and one fourth broader than high. Upper surface of the head granulated, its median longitudinal groove lanceolate, extending to opposite the hind edge of the orbit. Occipital process rounded posteriorly and half longer than wide at its base, a considerable interspace between it and the basal bone of the dorsal fin.

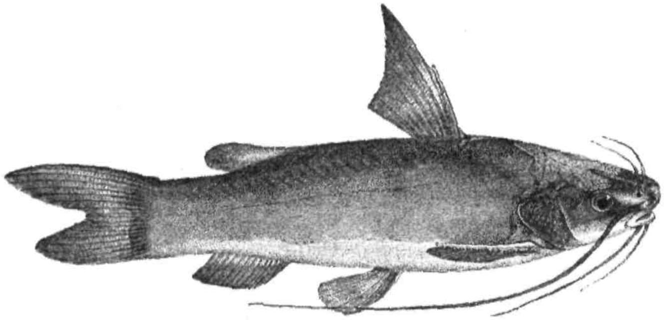

Fig. 64.—*Macrones gulio.*

Barbels—nasal shorter than the head, the maxillary reach to the middle or nearly the end of the ventral fin, the external mandibular are longer than the head or than the internal pair. *Teeth*—in a narrow, uninterrupted, crescentic band across the palate. *Fins*—dorsal spine half as long as the head, strong, anteriorly with one or two teeth at its upper extremity, serrated posteriorly. Anterior rays longer than the spine. Adipose dorsal with a short base equalling about half of the interspace between the two fins. Pectoral spine as long as the head excluding the snout, strong, and denticulated internally. The ventral fin does not reach the anal. Upper caudal lobe the longer, inferior sometimes rounded. *Air-bladder*—heart-shaped, divided along its centre by a strong partition, having a communicating orifice in its upper back part, while the whole has many subdivisions internally. *Colour*—lurid bluish brown on the back, becoming dull white beneath; fins, especially on their outer halves, usually black; maxillary barbels mostly black, fish from fresh waters sometimes have them whitish or white-tipped.

As in the rest of the genus *Macrones*, the ova in this species are small. Some specimens from the Hooghly have 11 branched anal rays, and the maxillary barbels only reach the end of the pectoral fin.

Hab. Seas, estuaries, and tidal waters from Sind and Bombay, throughout India and Burma to the Malay Archipelago. There are stuffed specimens in the Calcutta Museum 18 inches in length.

160. (6.) **Macrones punctatus.**

Bagrus punctatus, *Jerdon, Mad. Jour. L. Sc.* xv, 1849, p. 339.
Macrones punctatus, *Day, Fish. India*, p. 445, pl. c, fig. 3 (see synon.).
Sholang kelleté, Tam.

B. xi. D. 1/7 | 0. P. 1/7. V. 6. A. 11-13 (3-4/8-9). C. 17.

Length of head $4\frac{1}{2}$ in the young to 5, of caudal fin $5\frac{1}{2}$, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter 6 to 7 in the length of head, 2 diameters from end of snout, and $2\frac{1}{2}$ apart. Greatest width of head equals its length behind the nostrils; width of the gape of mouth equals two fifths of length of head. Upper jaw slightly the longer. Interorbital space rather convex and equal to the length of the snout; upper surface of the head and shoulder-bones furrowed, but without any tuberculated ridges. Median longitudinal groove very indistinct, lanceolate, and extending almost to the base of the occipital process, which is narrow and has an interval equal to twice its length between it and the basal bone. *Barbels*—the nasal reach the hinder edge of the orbit, the maxillary the base or middle of the ventral fin, the external mandibular the base of the pectoral, the internal are one third shorter. *Teeth*—on the palate in an uninterrupted crescentic band. *Fins*—dorsal spine of moderate strength, serrated posteriorly in its upper third, it is one half as long as the head but shorter than the first ray; adipose dorsal with a short base, equalling half the distance of the interspace between it and the first dorsal fin. Pectoral spine longer and stronger than that of the dorsal, equal in length to the head excluding the snout, rugose externally, denticulated internally. The ventrals arise on a vertical line just posterior to the last dorsal ray. Upper caudal lobe the longer. *Colour*—head and back dark greyish olive, becoming yellow on the abdomen; about ten black, rounded spots along the lateral line; fins dusky, except the ventrals, which are yellowish.

This fish is closely allied to *M. corsula*, but its head is much shorter in the adult, its upper surface is almost smooth, and its snout is not so flat.

Hab. Bhaváni river at base of Nilgiri hills; attaining at least 18 inches in length.

161. (7.) **Macrones corsula.**

Pimelodus corsula, *Ham. Buch. Fish. Ganges*, pl. i, fig. 72.
Macrones corsula, *Day, Fish. India*, p. 446, pl. c, fig. 5 (see synon.).
Punjah-gagah, Ooriah; *Kala shengal*, Maráthi.

B. x. D. 1/7 | 0. P. 1/9. V. 6. A. 11-13 (3-5/8). C. 17.

Length of head 4 to $4\frac{1}{3}$, of caudal fin 5 to 6, height of body 6 in

the total length. *Eyes*—diameter $5\frac{3}{4}$ to 7 in the length of head, 2 diameters from the end of snout, and 2 to $2\frac{1}{2}$ apart; interorbital space nearly flat. The greatest width of the head equals its length excluding the snout. Upper jaw the longer. Median longitudinal groove on the head extending to the base of the occipital process in the young, not so far in the adult. Occipital process very long and narrow, the width of its base being hardly equal to one fifth of its length; but in old specimens the anterior portion of this bone becomes concealed by skin, and appears to be very short, a very slight interspace exists between it and the basal bone of the dorsal fin. Extent of gape of the mouth equals three eighths of length of head. Upper surface of the head, opercles, and shoulder-bone roughened by the presence of tubercular ridges. *Barbels*—the nasal extend to below the middle of the orbit; the maxillary to nearly or quite the base of the anal; the external mandibular to the base of the pectoral, and the internal to opposite the posterior extremity of the preopercle. *Teeth*—in an uninterrupted semilunar band across the palate. *Fins*—dorsal spine slender, serrated posteriorly in its upper half, half as long as the head; base of adipose dorsal varying in length, usually as long as, or longer than, that of the rayed fin. Pectoral spine strong, compressed, rugose externally, denticulated along its whole extent internally; it is as long as the head excluding the snout, and slightly longer than that of the dorsal. Ventral half as long as the head, and not reaching the anal; in some specimens the upper caudal lobe is prolonged. Free portion of the tail rather longer than high. *Colour*—above greyish brown, below dull white. Fins greyish, stained with black. Several vertical black spots along the anterior portion of the lateral line.

Blyth observed that this is "a very mucous fish, and those brought to the bazaar are commonly much clotted over with an adhesive clayey mud, as if they had burrowed into it, and they are mostly brought many together, appearing as if dug out from the mud of ponds more or less dried up."

Hab. From Orissa through Bengal and Assam; attaining a foot or more in length.

162. (8.) Macrones microphthalmus.

Macrones microphthalmus, *Day, Fish. India*, p. 446, pl. c, fig. 4.

Nga-ike, Burmese.

B. x. D. 1/7 | 0. P. 1/9. V. 6. A. 12 (3/9). C. 17.

Length of head 4, of caudal fin $5\frac{1}{3}$, height of body $6\frac{3}{4}$ in the total length (excluding the filamentous prolongation of the caudal fin). *Eyes*—diameter 6 in the length of head, 2 diameters from the end of snout, and $2\frac{1}{2}$ apart. The greatest width of the head equals its length excluding the snout. Upper jaw the longer, snout spatulate. Median longitudinal groove on the head reaching nearly to the base of the occipital process, which is pointed, scarcely longer than wide at its base, and with a long interspace between it and the

basal bone of the dorsal fin. Upper surface of the head nearly smooth, the few ridges not being tuberculated. *Barbels*—nasal reaching the hinder third of the eye, maxillary the base of the caudal, external mandibular the first third of the pectoral, while the inner pair are shorter. *Teeth*—in an uninterrupted semilunar band across the palate. *Fins*—dorsal as high as the body, its spine very slender, only osseous at its base and articulated in its upper two thirds; length of base of adipose dorsal equal to that of the rayed fin, whilst the interspace between the two fins is of the same length. Pectoral as long as the postorbital portion of the head, the spine moderately strong and one half as long as the head, denticulated internally. Ventral nearly one half as long as head and just extending to the anal. Upper caudal lobe with a filamentous prolongation. Free portion of tail one half longer than high. *Colour*—of a light brown, shot with purple; fins darkest externally.

Possibly all these three last forms are local races of one species.

Hab. Burma, along the valley of the Irrawaddi.

163. (9.) Macrones cavasius.

Pimelodus cavasius, *Ham. Buch. Fish. Ganges*, pp. 203, 379, pl. xi, fig. 67.

Macrones cavasius, *Day, Fish. India*, p. 447, pl. c, fig. 1 (see synon.).

Vella kelletee and *Cutta*, Tam.; *Nahra jella*, Tel.; *Guntea*, Ooriah; *Kavasi tengara*, Beng.; *Nga-zin-zine*, Burmese; *Shingti* and *Shinguta*, Maráthi.

B. vi. D. 1/7 | 0. P. 1/8. V. 6. A. 11–13 (4/7–9). C. 16.

Length of head 6 to $6\frac{1}{4}$, of caudal fin 6, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of head, 1 to $1\frac{1}{2}$ diameters from the end of snout, and $1\frac{1}{4}$ apart. The greatest width of the head equal to its length excluding the snout. Snout rather obtuse, upper jaw a little the longer; width of the gape equal to two fifths of the length of the head; the cleft extends halfway to below the orbit. Upper surface of the head slightly roughened, its median longitudinal groove rather wide and extending to the base of the occipital process, which last is narrow and three or four times as long as wide at its base, and with a shallow groove along its last half or two thirds; no interspace between its posterior extremity and the basal bone of the dorsal fin. *Barbels*—the nasal nearly or quite as long as the head, the maxillary extending to beyond the base of the caudal fin, the external mandibular almost to the base of the ventral, while the internal are as long as the head. *Teeth*—on the palate in an uninterrupted crescentic band. *Fins*—dorsal spine weak, entire, and nearly or quite as long as the head excluding the snout, the fin is rather higher than the body and pointed; the adipose dorsal commences just behind the rayed one, and the length of its base is three times as long. Pectoral spine as long as, but stronger than, the dorsal, smooth externally, denticulated internally. Ventral arising just

posterior to the vertical from the last dorsal ray. Caudal pointed, upper lobe the longer. *Colour*—leaden superiorly, becoming yellowish along the abdomen and cheeks. Maxillary barbels, dorsal and caudal fins dusky; pectoral, ventral, and anal dull white. There is usually a black spot covering the basal bone of the dorsal fin. Occasionally there is a bluish band along the lateral line.

Hab. From Sind, throughout India, Assam, and Burma; attaining at least 18 inches in length.

164. (10.) Macrones tengara.

Pimelodus tengara, *Ham. Buch. Fish. Ganges*, pp. 183, 377, *and* Pimelodus batasius, pl. 23, fig. 60.

Macrones tengara, *Day, Fish. India*, p. 447, pl. ci, fig. 5 (see synon.).

Kuttahrah, Hind.; *Ting-ga-rah*, Assam and Punj.; *Karaal*, Punj.; *Bikuntia*, Ooriah.

B. x. D. 1/7 | 0. P. 1/8. V. 6. A. 11–13 (2–3/9–10). C. 19.

Length of head $4\frac{1}{3}$, of caudal fin $4\frac{1}{3}$, height of body $4\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of the head, $\frac{3}{4}$ to 1 diameter from the end of snout, and $1\frac{1}{2}$ apart. Greatest width of the head equal to its length excluding the snout. Gape of mouth equal to two fifths of the length of the head. Upper jaw slightly the longer. Median longitudinal groove extending to the base of the occipital process, which latter (as well as the upper surface of the head) is corrugated and about thrice as long as it is wide at its base, it reaches the basal bone of the dorsal fin. *Barbels*—the nasal are nearly as long as the head, the maxillary reach the base of the ventral, the external mandibular the base of the pectoral, while the internal are shorter. *Teeth*—in a narrow uninterrupted band across the palate. *Fins*—dorsal spine as long as the head excluding the snout, slightly serrated anteriorly in its upper third, and posteriorly in its whole extent; the length of the base of the adipose dorsal one third less than that of the rayed fin, and equal to one half the length of the interspace between the two fins; in some specimens it is much longer. Pectoral spine nearly as long as the head, stronger than that of the dorsal, smooth externally, and with about 13 denticulations internally. Ventrals arising on a vertical line just behind the last dorsal ray. Caudal forked, upper lobe the longer. *Colour*—brilliant yellow, with a black shoulder-spot and about five black longitudinal lines. In some specimens the mandibular barbels are white with a black streak.

Hab. Northern India, the Punjab and Assam; attaining 3 to 4 inches in length.

165. (11.) Macrones oculatus.

Bagrus oculatus, *Cuv. & Val. H. N. Poiss.* xiv, p. 424.

Macrones oculatus, *Day, Fish. India*, p. 448, pl. xcviii, fig. 4 (see synon.).

B. x. D. 1/7 | 0. P. 1/6. V. 6. A. 11–13 (3–4/8–9). C. 15.

Length of head $5\frac{1}{2}$, of caudal fin $4\frac{1}{3}$, height of body 5 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, about one diameter from end of snout and also apart. Profile from snout to dorsal fin rather elevated. Greatest width of the head equal to its length excluding the snout; upper jaw slightly the longer. Summit of the head rough; median longitudinal groove extending nearly to the base of the occipital process, which last is three times as long as wide at its base, whilst there is no interspace between it and the basal bone of the dorsal fin. *Barbels*—the nasal half as long as the head, the maxillary reach the middle of the anal fin, the outer mandibular the middle of the pectoral, whilst the inner are rather shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal spine of moderate strength, as long as the head excluding the snout, two or three teeth anteriorly, serrated posteriorly; the length of the base of the adipose dorsal equal to that of the rayed fin, but about one fourth less than the interspace between the two fins. Pectoral spine stronger than the dorsal, as long as the head behind the angle of the mouth, and with about ten very strong teeth internally. Caudal deeply forked, the upper lobe being the longer. *Colour*—silvery, lightest beneath, a dark spot at the commencement of the base of the dorsal fin, which is also black-tipped, a darkish band along the middle of the fin.

Hab. Malabar coast and the Coimbatore district. This species attains 5 or 6 inches in length.

166. (12.) Macrones vittatus.

Silurus vittatus, *Bloch, Ich.* t. 371, fig. 2.

Macrones vittatus, *Day, Fish. India,* p. 448, pl. xcviii, fig. 3 & pl. xcix, fig. 4 (see synon.).

Chivana, Maráthi; *Tengra,* Beng.; *Kuggur,* Hind.; *Kel-le-tee,* Tam.; *Sukujellah,* Tel.; *Kuntia,* Ooriah; *Mulleer* and *Kuggur,* Sind.; *Sin-gorah,* Assam; *Nga-sa-ring,* Mugh.; *Nga-zin-yine,* Burmese.

B. x. D. 1/7 | 0. P. 1/9. V. 6. A. 9–12 (2–3/7–9). C. 17.

Length of head $4\frac{3}{4}$ to 5, of caudal fin $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 6 in the length of head, $1\frac{3}{4}$ to 2 diameters from end of snout, and $1\frac{1}{2}$ to 2 apart. The greatest width of the head equal to its length excluding the snout or behind the angle of the mouth, and very little more than its height; in some specimens there is a considerable rise to base of the first dorsal fin. Upper surface of the head roughened in tubercles hardly forming lines, median longitudinal groove reaching to midway behind the hind edge of the eye and the base of the occipital process, which is rough, three times as long as wide at its base, and a short (if any) interspace exists between it and the basal bone of the dorsal fin; radiating rough lines on the opercle; shoulder-bone with its triangular portion a little longer than wide at its base, and roughened in raised lines. *Barbels*—the maxillary reach the ventrals, the nasal the opercle, the external mandibular the first third of the pectoral spine, whilst the internal are shorter. *Teeth*—in

an uninterrupted semilunar band across the palate. *Fins*—dorsal two thirds as high as the body, its spine half as long as the head, with two or three teeth anteriorly in the young, while it is finely serrated posteriorly; length of the base of the adipose dorsal variable, in some specimens it is equal to that of the interspace between the two fins, and a little more than the length of the rayed fin. Pectoral spine strong, as long as the head excluding the snout, denticulated internally with about 16 coarse teeth. Ventral reaching from half to two thirds of the distance to the base of the anal. Upper caudal lobe the longer. *Colour*—silvery or golden; old specimens at Madras have a light bluish band along the middle of the side, and a narrow light one above and below it, a dark shoulder-spot, and sometimes another near the base of the caudal fin. More to the eastward, as in Orissa and Bengal, the colours are more vivid, usually of a golden hue, with a black shoulder-spot, a narrow black band along either side of the lateral line, a lighter parallel one below, and two wider ones above. Sometimes these fish appear to be dark, with five longitudinal silvery bands. Tips of fins usually dark.

This fish is termed "the fiddler" in Mysore; I touched one which was on the wet ground, at which it appeared to become very irate, erecting its dorsal fin and making a noise resembling the buzzing of a bee, evidently a sign of anger. When I put some small carp into an aquarium containing one of these fishes it rushed at a small example, seized it by the middle of its back and shook it like a dog killing a rat; at this time the barbels of the *Macrones* were stiffened out laterally like a cat's whiskers.

Hab. Throughout Sind, the continent of India, Assam, Burma, Siam, also Ceylon; attaining 7 or 8 inches in length.

167. (13.) Macrones leucophasis.

Bagrus leucophasis, *Blyth, J. A. S. B.* xxix, 1860, p. 148.
Macrones leucophasis, *Day, Fish. India*, p. 449, pl. c, fig. 2 (see synon.).

Nga-pet-lek and *Nga-nouk-thawa*, Burmese (signifies "topsy-turvy," as the fish is believed to swim in that position). Also *Nga pulléy* or *pă-léy* at Moulmein.

B. xi. D. 1/7 | 0. P. 1/8–10. V. 6. A. 11–12 (3/8–9). C. 17.

Length of head $4\frac{1}{2}$ to 5, of caudal fin $3\frac{1}{2}$ to $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in the length of the head, $1\frac{1}{2}$ to 2 diameters from the end of snout, and 1 to $1\frac{1}{3}$ apart. The greatest width of the head equal to its length behind the nostrils. Snout rounded, the upper jaw slightly the longer. Median longitudinal groove on the head does not quite reach the base of the occipital process, which last is twice as long as wide at its base, while between it and the basal bone of the dorsal fin is a pyriform bone about twice as long as wide. Upper surface of the head rather rugose. *Barbels*—the nasal reach to the front edge or the middle of the eye, the maxillary to the anal fin, the external man-

dibular to the middle of the pectoral, and the internal to the gill-openings. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal spine moderately strong, as long as the head posterior to the nostrils or angle of the mouth, finely serrated posteriorly in the upper fourth; the adipose fin commences just behind the first dorsal, and the length of the base is from twice to two and a half times that of the base of the first dorsal. Pectoral spine much stronger than that of the dorsal, a little shorter, and denticulated internally. Caudal deeply forked, the lobes having filamentous prolongations. *Air-bladder*—large. *Colour*—when alive the lower surface is olive-green or yellow and the head white, but after death it becomes purplish black over the body and fins; some white dots exist on the body.

Hab. Rivers of Burma; attaining a foot or more in length.

168. (14.) Macrones montanus.

Bagrus montanus, *Jerdon, Mad. Jour. L. Sc.* xv, 1849, p. 337.
Macrones montanus, *Day, Fish. India,* p. 449, pl. ci, fig. 4.

B. x. D. 1/7 | 0. P. 1/6. V. 6. A. 12 (3/9). C. 19.

Length of head 5, of caudal fin 5, height of body 6 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in the length of the head, rather above 1 diameter from the end of snout, and $1\frac{1}{2}$ apart. A very slight rise in the profile from snout to base of first dorsal fin. Greatest width of the head equal to its length behind the angle of the mouth. Upper jaw slightly the longer; the width of the mouth equal to two fifths of the length of the head. Upper surface of the head roughened in granulated lines which extend on to the occipital process. Median longitudinal groove extending to midway between the eye and the base of the occipital process, which is narrow, about four times as long as wide at its base, and reaching the basal bone of the dorsal fin; opercle with roughened radiating lines; shoulder-bone rather longer than deep at its base and with roughened lines. *Barbels*—the nasal extend to rather behind the hinder edge of the eye, the maxillary to the anal fin, the external mandibular to the end of the pectoral, the internal are shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal nearly as high as the body, its spine rather weak, half as long as the head and posteriorly serrated; length of base of adipose dorsal one third more than that of rayed fin, which equals that of the interspace. Pectoral spine strong, as long as the head excluding the snout, and with about 16 strong denticulations internally. Ventral does not reach anal; upper caudal lobe the longer. *Colour*—silvery superiorly, with a tinge of yellow on the under surface of the head and along the abdomen, a bluish shoulder-spot, and a silvery line along the side ending in a dark spot at the base of the caudal fin, one or two light bands along the side above the lateral line; fins tinged with green.

Hab. Wynaad range of hills and Manantoddy.

169. (15.) Macrones keletius.

Bagrus keletius, *Cuv. & Val. H. N. Poiss.* xiv, p. 411.
Macrones keletius, *Day, Fish. India*, p. 449, pl. xcviii, fig. 5 (see synon.).

Tengali, Maráthi.

B. x. D. 1/7 | 0. P. 1/10. V. 6. A. 9–10 (2–3/7–8). C. 17.

Length of head $4\frac{2}{3}$, of caudal fin 5 to $5\frac{1}{4}$, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the length of the head, $1\frac{1}{2}$ diameters from the end of snout, and 2 apart. The greatest width of the head equal to its length excluding the snout. Upper jaw slightly the longer. The upper surface of the head roughened in closely set tubercular lines continued on to the occipital process, opercle likewise striated with similar lines. Median longitudinal groove rather constricted in its centre, it reaches to opposite the hind border of the preopercle. Occipital process narrow, three times as long as wide at its base, and not quite reaching the basal bone. *Barbels*—the nasal reach the opercle, the maxillary the middle of the anal fin, the external mandibular the end of the pectoral spine, while the internal are shorter. Humeral process rather short and pointed. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal as high as body, its spine with two or three teeth anteriorly near its summit and serrated posteriorly, it equals three sevenths of the length of the head; length of the base of the adipose dorsal equal to that of the rayed fin or of the interspace between the two. Pectoral reaching two thirds of the way to the ventral; pectoral spine stronger than that of the dorsal, and equal to the length of the head excluding the snout. The ventral does not reach the anal. Upper caudal lobe the longer. A well-marked pre-anal papilla. *Colour*—silvery along the back, becoming dull white beneath. A dark shoulder-spot, a light band along the lateral line, and a silvery one above and another below it; dorsal and caudal black-tipped, anterior half of anal dark.

Hab. Madras to Pondicherry and inland to Coimbatore, also Ceylon; attaining about 4 inches in length. Jerdon observed that this species is also found in Mysore.

170. (16.) Macrones malabaricus.

Bagrus malabaricus, *Jerdon, Mad. Jour. L. Sc.* xv, 1849, p. 338.
Macrones malabaricus, *Day, Fish. India*, p. 450, pl. ci, fig. 2 (see synon.).

B. x. D. 1/7 | 0. P. 1/9. V. 6. A. 10–11 (2–3/8). C. 18.

Length of head $4\frac{3}{4}$ in a Wynaad specimen to $5\frac{1}{2}$, of pectoral 6 to 7, of caudal fin 5 to 6, height of body 6 to 7 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in the length of head, $1\frac{1}{4}$ diameters from the end of snout, and $1\frac{3}{4}$ apart. Scarcely any rise in the dorsal profile from the snout to the base of the dorsal fin.

Greatest width of the head equal to its length behind the angle of the mouth. Upper surface of the head nearly smooth. Median longitudinal groove extending to midway between hind edge of the eye and the base of the occipital process, which last is about twice as long as wide, whilst there exists a considerable interspace between it and the basal bone of the dorsal fin. The triangular portion of the shoulder-bone curves rather upwards, and is one fourth longer than deep at its base. *Barbels*—the nasal reach to a little behind the orbit, the maxillary to the middle or end of the ventral fin, the external mandibular to the end of the pectoral, while the internal are a little shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal nearly as high as the body; the spine weak, finely serrated or almost entire posteriorly, with one denticulation anteriorly near the summit, the length of the spine equal to that of the postorbital portion of the head; length of base of adipose dorsal one third more than that of the rayed fin, or of the interspace between the two fins. Pectoral spine strong and equal to the length of the head excluding the snout, internally with about eight or ten strong denticulations, roughened externally. Upper caudal lobe the longer. *Colour*—deep leaden, usually with a dark blotch on the shoulder surrounded by a lighter edge, another at the base of the caudal fin; a dark band along the lateral line; abdomen of a dull white. Fins with minute dark spots, making the upper portion of the dorsal and the lower third of the anal blackish.

Hab. Malabar coast of India and the Wynaad; attaining upwards of 6 inches in length.

171. (17.) Macrones armatus.

Hypselobagrus armatus, *Day, P. Z. S.* 1865, p. 289.
Macrones armatus, *Day, Fish. India,* p. 450, pl. ci, fig. 3.
Cuaree, Mal.

B. x. D. 1/7 | 0. P. 1/9. V. 6. A. 11 (3/8). C. 17.

Length of head $5\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in the length of the head, $1\frac{1}{4}$ from end of snout, and 2 apart. A considerable rise from the snout to the base of the dorsal fin. The greatest width of the head equals its height or its length excluding the snout. Upper surface of the head roughened, the median longitudinal groove almost reaching the base of the occipital process, which last is about three times as long as wide, and reaches the basal bone of the dorsal fin; shoulder-bone roughened in lines and half longer than deep at its base. *Barbels*—the nasal nearly reach the opercle, the maxillary the end of ventral fin, the outer mandibular the end of pectoral spine, while the internal are shorter. *Teeth*—in an uninterrupted crescentic band across the palate. *Fins*—dorsal as high as the body below it, its spine very finely serrated posteriorly, or entire, and four ninths of the length of the head; length of base of adipose dorsal exceeding that of the rayed fin, or of the interspace between

the two. Pectoral spine strong, as long as the head excluding the snout, and having from ten to fourteen strong denticulations internally. Upper caudal lobe the longer. An anal papilla before the fin. *Colour*—leaden or brown superiorly, lighter beneath, with or without a brown band along the side, and a dark blotch at the base of the caudal fin. Upper half of dorsal fin darkish, and a dark band along the anal.

Hab. Malabar and the Wynaad range of hills.

172. (18.) **Macrones bleekeri.**

Bagrus keletius, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Ich. Beng.* p. 115 (*not Cuv. & Val.*).
Macrones bleekeri, *Day, Fish. India*, p. 451, pl. ci, fig. 1 (see synon.).

B. x. D. 1/7 | 0. P. 1/9–10. V. 6. A. 9–10 (3/6–7). C. 17.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, of caudal fin $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, nearly 2 diameters from end of snout, and $1\frac{1}{2}$ apart. The greatest width of the head equals its length behind the hind nostril. Snout somewhat obtuse. Width of the gape of the mouth nearly equals half the length of the head. Upper surface of head, opercles, occipital bone, and humeral process granulated. Median longitudinal groove on the head shallow, and reaching to the base of the occipital process, which is twice as long as broad at its base, and reaches the basal bone of the dorsal fin. Occipital process not grooved, but with ridged lines. *Barbels*—nasal reaching the hind edge of the eye, maxillary the anal fin, external mandibular the base of the pectoral, internal a little shorter. *Teeth*—on the palate in an uninterrupted semilunar band. *Fins*—dorsal fin rounded, not so high as the body, the spine smooth and equal to half the length of the head (in Sind specimens the spine is slightly serrated posteriorly, and I once saw a specimen that had eight branched dorsal rays); adipose dorsal commencing just behind the rayed fin, and having its base twice the length of the head. Pectoral spine stronger than that of the dorsal, and as long as the head excluding the snout; denticulated internally. Caudal with pointed lobes, the upper being the longer. *Colour*—brownish-grey, with two light longitudinal bands, one above the other, below the lateral line; some specimens have a dark shoulder-spot and a dark band along the middle of the anal fin. The fins are mostly darkest at their edges. In a specimen from Burma there is a dark spot at the end of the lateral line and light longitudinal body-bands.

Hab. Sind, Jumna, upper waters of the Ganges, and Burma, not attaining to a large size. It descends the rivers as low as Bengal.

20. Genus **LIOCASSIS**, Bleeker.

Syn. *Rama*, Bleeker; *Macrones*, pt., Günther.

Branchiostegals six. Gill-openings very wide, the membrane

not being confluent with the skin of the isthmus, and notched as far as the chin. Mouth of moderate size, anterior, the upper jaw the longer. Nostrils distant one from the other. Barbels consisting of a short maxillary pair, and either two pairs or none on the mandible. Teeth villiform in both jaws, and in an uninterrupted band across the palate. One spine and six rays in the first dorsal; adipose fin present, it and the anal of moderate length. Ventral with six rays, situated behind the base of the dorsal; caudal forked. Air-bladder not enclosed in bone.

Geographical Distribution. Eastern Bengal, Assam and Burma, to the Malay Archipelago.

Synopsis of Indian Species.

A. 16. A dark shoulder-mark. Body with short vertical dark marks. 3 pairs of barbels.... 1. *L. rama*, p. 163.
A. 11. Two black blotches on the lateral line. A pair of maxillary barbels only .... 2. *L. fluviatilis*, p. 164.

173. (1.) **Liocassis rama.** (Fig. 65.)

Pimelodus rama, *Ham. Buch. Fish. Ganges*, pp. 176, 377, pl. 3, fig. 55.
Leiocassis rama, *Day, Fish. India*, p. 451, pl. cxv, fig. 2 (see synon.).

B. vi. D. 1/6 | 0. P. 1/9. V. 6. A. 16 (3/13). C. 18.

Length of head 4 to $4\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—subcutaneous, diameter 3 to $3\frac{1}{4}$ in the length of the head, 1 diameter from the end of the snout, and also apart. The greatest width of the head equal to its length excluding the snout. There is a considerable rise in the dorsal profile to the base of the rayed fin. Upper jaw the longer. Upper surface of

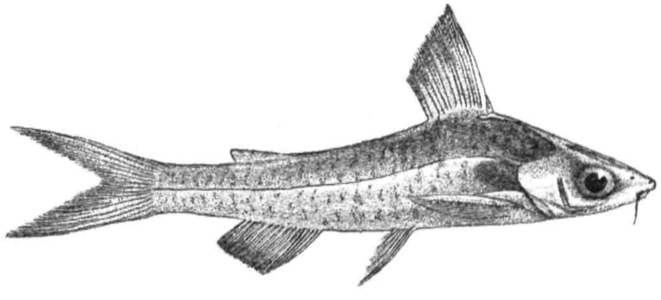

Fig. 65.—*Liocassis rama.*

the head covered with skin; a rather wide median longitudinal groove extends up the first third of the occipital process, which is twice as long as wide at its base, and a distinct oval interneural

shield exists between the process and the basal bone of the dorsa fin. Scapular process well developed; humero-cubital process rather longer than high at its base. *Barbels*—a short maxillary pair, two pairs behind the symphysis of the lower jaw. *Teeth*—in an uninterrupted, semicircular villiform band across the palate. *Colour*—dull yellow, with short, vertical, brown marks and a dark shoulder-spot.

Hab. Eastern Bengal and Assam. This fish appears not to exceed 2 or 3 inches in length. The figure is twice the natural size.

174. (2.) Liocassis fluviatilis.

Liocassis fluviatilis, *Day, Fishes of India, Supplement*, 1888, p. 805.

B. vi. D. 1/7 | 0. P. 1/7. V. 6. A. 11. C. 18.

Length of head $4\frac{1}{4}$, of caudal fin $5\frac{1}{4}$, height of body 5 in the total length. *Eyes*—rather small, high up and in the anterior half of the head. The greatest width of the head equal to two thirds of its length. There is a moderate rise from the snout to the base of the dorsal fin. Upper jaw the longer; upper surface of head smooth. *Barbels*—a maxillary pair reaching to the posterior edge of the orbit, no others were detected. *Teeth*—in an uninterrupted villiform band across the palate. *Fins*—dorsal spine smooth and nearly as long as the fourth ray, which is four fifths as high as the body below it. Adipose dorsal rather long, commencing a short distance behind the base of the rayed fin. Pectoral spine denticulated internally. *Colour*—yellowish horny, with darker shades of olive-brown on the snout and along the back, also some cloudy markings. A large black blotch on the lateral line above the anal fin, another between the pectoral and first dorsal. Tip of dorsal and ends of both caudal lobes black.

Hab. Col. Tickell obtained four examples, the largest $3\frac{1}{2}$ inches long, from the Anin, a stream rising near Weywoon, Wagroo, in the Tenasserim Provinces.

21. Genus RITA, Bleeker.

Syn. *Gogrius*, Day.

Branchiostegals eight. Gill-openings with a free posterior edge and not confluent with the skin of the isthmus. Mouth transverse, upper jaw the longer; nostrils on either side subcontiguous, but the pair on one side widely separated from that on the other. Eyes subcutaneous, without free circular margins. Barbels six, a minute pair at the posterior nostrils, a maxillary and a mandibular pair. Teeth villiform in both jaws or mixed with molariform ones in the mandibles, molariform on the palate. One strong spine and six rays in first dorsal fin, the adipose and the anal of moderate length. Ventral posterior to the base of the dorsal, and having

seven or eight rays; caudal forked. Air-bladder not enclosed in bone, with or without a posterior prolongation. The ova are much larger than in *Macrones*, but very much smaller than in *Arius* and its allies. A strong cubito-humeral process protects the pectoral spine when it is flexed along the side of the body.

Geographical Distribution. Large rivers of Sind, India (except its southern portions), and Burma far above Mandalay.

Uses. Food for the lower classes. These fishes retain life long after their removal from water, and can be conveyed fresh for long distances.

Synopsis of Indian Species.

A. Some of the posterior teeth in the lower jaw molariform.
  Eye 8 to 10 diameters in length of head. Patches of teeth in palate wide apart. Dorsal spine in the adult as long as the head or longer, entire anteriorly . . 1. *R. buchanani*, p. 165.
  Eye $5\frac{1}{2}$ to 6 diameters in length of head. Patches of teeth in palate close together. Dorsal spine as long as head excluding the snout, entire anteriorly 2. *R. pavimentata*, p. 167.
  Eye 4 diameters in the length of head. Patches of teeth in palate close together in their front halves. Dorsal spine longer than the head, coarsely serrated anteriorly in its whole extent 3. *R. chrysea*, p. 167.

B. Teeth in lower jaw villiform or cardiform.
  Eye $4\frac{1}{2}$ to 5 diameters in length of head. Patches of teeth in palate wide apart. Dorsal spine as long as the head or longer, serrated anteriorly in its lower third . . . . 4. *R. hastata*, p. 168.

175. (1.) **Rita buchanani.** (Fig. 66.)

Pimelodus rita, *Ham. Buch. Fish. Ganges*, pp. 165, 376 pl. xxiv, fig. 53.
Rita buchanani, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Ich. Beng.* p. 123, t. 3, fig. 1; *Day, Fish. India*, p. 454, pl. ciii, fig. 1 (semi-adult), fig. 2 (immature), and pl. civ, fig. 2 (young) (see synon.).

Nga-htway, Burmese.

B. viii. D. 1/6 | 0. P. 1/10. V. 8. A. 12–13 (4–5/9). C. 19.

Length of head 4 to $4\frac{1}{3}$, of caudal fin 5, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter 8 to 10 in the length of head, 3 diameters from the end of snout and $4\frac{1}{2}$ apart. The greatest width of the head equal to its length behind the nostrils, whilst its height is a little less. Upper surface of the head covered with skin except a strip anterior to the base of the occipital process, that bone, the scapular and cubito-humeral processes granulated;

length. *Eyes*—diameter 6 in the length of head, $2\frac{1}{4}$ diameters from the end of snout, and 3 apart. The greatest width of the head exceeds its height by one third, and is one sixth less than its length. Upper jaw the longer, the width of the gape of the mouth

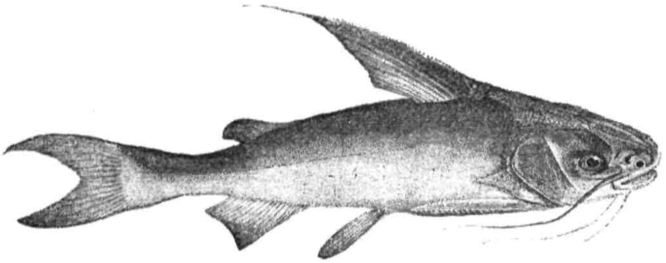

Fig. 67.—*Arius nenga.*

equal to half the length of the head. The median longitudinal groove on the head is shallow anteriorly, but becomes narrow posteriorly and does not quite extend to the base of the occipital process, which is keeled, nearly as broad at its base as it is long; basal bone of dorsal fin narrow and crescent-shaped. Upper surface of the head, almost as far forward as the eyes, and the occipital process studded with coarse granules. *Barbels*—the maxillary pair reach the posterior third of the pectoral fin, whilst the outer mandibular pair are as long as the head. *Teeth*—on the palate villiform in two triangular patches, approximating superiorly and parallel along the median line. *Fins*—dorsal much higher than the body, the dorsal spine strong, as long as the head, and having an elongated soft prolongation, it is granulated anteriorly in its lower half, serrated in its upper, and also posteriorly; base of adipose dorsal nearly as long as that of the rayed fin. Pectoral fin almost reaching the ventral; pectoral spine nearly as long as the head, rough, granulated externally and denticulated internally. Upper caudal lobe the longer. *Colour*—dull yellow, the fins being externally stained with black.

This species is closely allied to *A. cœlatus*, its maxillary barbel is longer, the dorsal spine more produced, and the colours different. It may be only a variety.

Hab. Hooghly at Calcutta. Blyth says this fish attains 12 or 13 inches in length.

181. (3.) Arius cœlatus.

Arius cœlatus, *Cuv. & Val. H. N. Poiss.* xv, p. 66; *Day, Fish. India*, p. 459, pl. cv, fig. 5 (see synon.).

B. vi. D. 1/7 | 0. P. 1/9. V. 6. A. 19 (5–6/13–14). C. 15.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, of caudal fin 5 to 6, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter 6 to 9 in the length of the

head, 2 to $2\frac{1}{2}$ diameters from the end of snout, and from 3 to 4 apart. Head broader than high, its greatest width being equal to its length behind the nostrils, the width of the mouth equals the postorbital length of the head or a little more. Upper jaw the longer, the angle of the mouth does not extend so far posteriorly as to below the orbit. Upper surface of the head and occipital process strongly granulated, the median longitudinal groove narrow and deep posteriorly and not quite reaching the base of the occipital process, which is a little keeled, as broad at its base as it is long or slightly broader, its anterior extremity slightly concave and extending to the basal bone, which is V-shaped and rather narrow. *Barbels*—the maxillary reach the middle of the pectoral fin, whilst the external mandibular pair are one fifth shorter. *Teeth*—villiform in two somewhat widely separated triangular patches, the vomerine being confluent with the palatine. *Fins*—dorsal spine very strong especially in its lower half, which is granulated both laterally and anteriorly, serrated in its upper portion, also posteriorly in its whole extent, it is nearly or quite as long as the head and has a soft prolongation; base of adipose dorsal shorter than that of the rayed fin, and equal to about half the extent of the interspace between the two fins. Pectoral spine as strong as, but rather shorter than, that of the dorsal, granulated externally, serrated internally. Ventral not reaching the anal. Upper caudal lobe sometimes the longer. *Colour*—bluish along the back and sides, becoming white beneath. Adipose dorsal black, with its inferior and posterior margins yellow. Superior portion of dorsal, the end of the pectoral and ventrals black, as is also the anterior part of the anal.

Hab. From Bombay through the Indian Seas to the Malay Archipelago, not uncommon at Calcutta; attaining to a considerable size.

182. (4.) Arius acutirostris.

Arius acutirostris, *Day, Fish. India*, p. 459, pl. cvii, fig. 1.

B. v. D. 1/7 | 0. P. 1/10. V. 6. A. 19 (5/14). C. 17.

Length of head $3\frac{1}{2}$, of caudal fin 6, height of body 7 in the total length. *Eyes*—diameter 7 in the length of head, $3\frac{1}{2}$ diameters from the end of snout, and 2 apart. The greatest width of the head equals about half its length, and is one sixth more than its height. Snout fleshy and elongated, extending some distance beyond the mouth; mouth inferior, the extent of its gape equalling one third of the length of the head. Upper surface of the head granulated, or with roughened lines. Median longitudinal groove on head not extending to the base of the occipital process, which is slightly keeled, is rather longer than wide at its base, and reaches the narrow V-shaped basal bone of the dorsal fin. *Barbels*—short, the maxillary reach beyond the hind edge of the eye; the outer mandibular are about one third of the length of the head; the

inner are shorter. *Teeth*—the villiform band in the premaxillaries is about one third as deep as wide; those on the palate likewise villiform in two somewhat obliquely oval patches diverging anteriorly. *Fins*—dorsal spine rather strong, half as long as the head and serrated on both sides; the base of the adipose fin is two thirds as long as that of the rayed fin. Pectoral spine of about the same length as the dorsal and serrated on both edges; the fin reaches two thirds of the distance to the ventral; the latter does not extend to the anal. *Colour*—upper portion of rayed and upper two thirds of adipose dorsal black; pectoral, ventral, and anal stained grey.

Hab. The Salween river at Moulmein in Burma. Tickell observed that this species was one of the commonest fishes in the Moulmein bazaar. It attains a foot or more in length.

183. (5.) **Arius sumatranus.**

Bagrus sumatranus, *Bennett, Life of Sir S. Raffles*, p. 691.
Arius sumatranus, *Day, Fish. India*, p. 460, pl. cvii, fig. 6 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18–19 (5/13–14). C. 17.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, of caudal fin $5\frac{1}{4}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in the length of head, $1\frac{3}{4}$ diameters from the end of snout, and 2 apart. The greatest width of the head exceeds its height and equals its length behind the angle of the mouth. Upper surface of the head with scattered granulations, which are more lineated on the occipital process. Median longitudinal groove narrow posteriorly, nearly reaching the base of the occipital process, the edges in the last portion of the groove are raised. Occipital process slightly keeled, as broad at its base as it is long; basal bone crescent-shaped and narrow. *Barbels*—the maxillary reach end of head, the outer mandibular the base of the pectoral fin. *Teeth*—in palate villiform, in two triangular patches diverging posteriorly. *Fins*—dorsal spine as long as the head behind the angle of the mouth, and serrated on both edges; base of adipose dorsal two thirds of that of the rayed fin. Pectoral spine as long as the head excluding the snout, externally roughened in the lower, serrated in the upper portion, internally denticulated, not reaching the ventral. Ventral extending two thirds of the way to the anal. *Colour*—bluish green above, becoming lighter on the sides and beneath; edges of fins stained grey, very little black on adipose dorsal.

Hab. Andamans to the Malay Archipelago.

184. (6.) **Arius venosus.**

Arius venosus, *Cuv. & Val. H. N. Poiss.* xv, p. 69; *Day, Fish. India*, p. 460, pl. cvi, fig. 2 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18–19 (5–6/13). C. 17.

Length of head $5\frac{1}{6}$, of caudal fin 5, height of body 6 in the total length. *Eyes*—diameter $4\frac{1}{4}$ in the length of head, $1\frac{1}{2}$ diameters

from the end of snout, and 2 apart. Snout rather obtuse, and the upper jaw the longer; the width of the gape of the mouth equal to one half the length of the head. The greatest width of the head equal to its length excluding the snout, and slightly exceeding its height. Upper surface of the head with scattered granulations, which are more numerous on the occipital process. Median longitudinal groove on the head shallow except in its posterior portion, which is narrow and deep as far as the base of the occipital process, this is keeled and as broad at its base as it is long. Basal bone V-shaped, and laterally narrow. *Barbels*—the maxillary extend to the base of the pectoral fin, the outer mandibular are shorter. *Teeth*—villiform on the palate, in two triangular patches, the points of which are directed backwards, the patches are about as large as the eye, as broad as long, and approximate somewhat anteriorly. *Fins*—the dorsal as high as the body, its spine rather strong and as long as the head behind the angle of the mouth; anteriorly the spine is serrated in its upper, granulated in its lower half, posteriorly it is serrated; base of adipose dorsal equal to half that of the rayed fin. Pectoral spine as long as that of the dorsal, granulated and serrated externally, denticulated internally. The ventral reaches the anal; upper caudal lobe the longer. *Colour*—bluish.

Hab. From Burma to the Malay Archipelago.

185. (7.) Arius parvipinnis.

Arius parvipinnis, *Day, Fish. India*, p. 460, pl. cxiii, fig. 1 (see synon.).

Chinta jella, Tel.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 19 (5/14). C. 18.

Length of head $4\frac{3}{4}$, of caudal fin $4\frac{1}{4}$, height of body 6 in the total length. *Eyes*—in anterior half of the head, diameter $5\frac{3}{4}$ in the length of the head, $1\frac{2}{3}$ diameters from the end of snout, and 3 apart. Greatest width of the head equal to its length behind the nostrils, and exceeding its height by one fourth. Upper jaw somewhat the longer; the width of the gape of the mouth equal to that of the postorbital length of the head. Upper surface of the head and occipital process studded with coarse granulations. Median longitudinal groove on head well marked, lanceolate, its last portion deep and not extending so far as the base of the occipital process, which has a granulated keel along its centre, is as long as wide, and reaches a narrow crescentic basal bone. *Barbels*—the maxillary reach the end of the pectoral fin. *Teeth*—villiform in two pear-shaped crescentic patches placed well forwards, diverging, and their small end anterior. *Fins*—dorsal spine strong, laterally roughened, serrated anteriorly in its upper half, also posteriorly, as long as the head behind the angle of the mouth. Pectoral spine stronger than the dorsal, of the same length, and serrated on both edges, it reaches two thirds of the distance to

the ventral; the latter is very small, a little above half as long as the pectoral, and does not reach the anal. Caudal deeply lobed, with its upper lobe rather produced. *Colour*—on the upper surface dull leaden, sides and abdomen whitish, adipose dorsal with a black blotch; pectoral, ventral, and outer half of anal dark.

Hab. Coromandel coast of India.

186. (8.) **Arius subrostratus.**

Arius subrostratus, *Cuv. & Val. H. N. Poiss.* xv, p. 62; *Day, Fish. India*, p. 461, pl. cvi, fig. 6 (see synon.).

B. vi. D. 1/7 | 0. P. 1/9. V. 6. A. 17–20 (5–6/12–14). C. 17.

Length of head $3\frac{1}{3}$ to 4, of caudal fin 6 to 7, height of body 5 in the total length. *Eyes*—diameter 5 to 6 in length of head, $2\frac{1}{2}$ to 3 diameters from the end of snout, and 2 to $2\frac{1}{2}$ apart. The greatest width of the head rather exceeds its height and equals four sevenths of its length. Snout elongated and a little depressed, the upper jaw the longer, the width of the gape equals two sevenths of the length of the head, cleft short, extending one third of the distance to the orbit; median longitudinal groove on the head shallow, anteriorly becoming narrow, and posteriorly deep, extending nearly to the base of the occipital process. Upper surface of the head behind the middle of the orbit granulated, as is also the occipital process, which is rather wider at its base than it is long, has nearly straight lateral edges, and reaches the narrow basal bone of the dorsal fin. *Barbels*—short, the maxillary pair do not quite reach the eye, the outer mandibular are still shorter, and the internal the shortest. *Teeth*—those on the palate villiform, in two small patches wide asunder, one on either side of the palate, not longer than the diameter of the eye. *Fins*—dorsal one fourth higher than the body, its spine not very strong, rather above half as long as the head, rugose anteriorly, serrated posteriorly; length of the base of the adipose dorsal equal to two thirds of that of the rayed fin. Pectoral scarcely reaching the ventral; pectoral spine as long as that of the dorsal, or a little longer, serrated internally. Ventral reaching the anal; caudal forked. *Colour*—silvery leaden along the back when fresh, a series of about fifteen minutely spotted vertical bands seen on the body. Fins stained with grey.

Hab. Malabar coast of India; attaining to a foot in length.

187. (9.) **Arius sagor.**

Pimelodus sagor, *Ham. Buch. Fish. Ganges*, pp. 169, 376.
Arius sagor, *Day, Fish. India*, p. 461, pl. cv, fig. 1 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 17–19 (3–4/14–15). C. 15.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, of caudal fin 5 to 6, height of body 5 in the total length. *Eyes*—diameter $6\frac{1}{2}$ to 7 in the length of head, 2 diameters from end of snout, and $3\frac{1}{2}$ apart. Head depressed, much broader than high, its width equal to its length or a little

less. Upper jaw the longer, the width of the gape of the mouth half the length of the head. The median longitudinal groove on the head shallow, extending to a little behind the posterior edge of the eye. Upper surface of the head granulated in radiating lines. Occipital process one half wider at its base than it is long, its posterior extremity rounded where it meets the basal bone of the dorsal fin, which is large and somewhat butterfly-shaped. *Barbels*—the maxillary reach to the middle or end of the pectoral spine, the outer mandibular to its base or middle. *Teeth*—on the palate in two confluent villiform patches on either side, meeting in the mesial line, each of these patches has a convex inner edge. *Fins*—dorsal higher than the body, the spine strong and as long as the head excluding the snout, granulated or serrated anteriorly, serrated posteriorly; the base of the adipose nearly as long as that of the rayed fin. Pectoral spine stronger than that of the dorsal and equally long, serrated externally along its outer fourth and denticulated internally, its outer ray often prolonged. Ventral nearly reaching the anal. Upper caudal lobe the longer. *Colour*—greenish brown, becoming lighter on the abdomen; some specimens have narrow vertical bands of spots on the body. Fins tinged with dark.

Hab. From Bombay through the seas and estuaries of India to the Malay Archipelago. Said to be very common at Batavia, where it is largely consumed. This species attains to at least 3 feet in length.

188. (10.) Arius sona.

Pimelodus sona, *Ham. Buch. Fish. Ganges*, pp. 172, 376.
Arius sona, *Day, Fish. India*, p. 462, pl. cv, fig. 2 (see synon.).

B. vi. D. 1/7 | 0. P. 1/12. V. 6. A. 17 (6/11). C. 17.

Length of head 4, of caudal fin 5 to 6, height of body 6 in the total length. *Eyes*—diameter 7 to 9 in the length of head, $2\frac{1}{2}$ to 3 diameters from end of snout, and $3\frac{1}{2}$ to $4\frac{1}{2}$ apart. Head one half broader than high, and almost as wide as long. Upper jaw the longer; the extent of the gape of the mouth equal to two thirds of the length of the head. Median longitudinal groove on the head wide, but not extending so far as the base of the occipital process; the latter keeled, convex at its posterior extremity where it reaches the basal bone of the dorsal fin which is somewhat narrow, especially in its centre, while each side is slightly bent into an S-shaped form. The occipital process is as wide at its base as it is long or rather wider; it and also the crown of the head from behind the eyes are granulated, these granulations have somewhat of a radiating direction. *Barbels*—the maxillary reach to the end of the head, the outer mandibular are shorter. *Teeth*—on palate villiform, those on each palatine in a large somewhat triangular patch which is emarginate posteriorly, anteriorly two small patches on the vomer connect the two palatine ones together. *Fins*—dorsal spine strong, granulated anteriorly, serrated posteriorly, and as long as the head excluding the snout, but not so high as the

rays, which are higher than the body; length of the base of the adipose dorsal equal to that of the rayed fin. Pectoral spine stronger and usually slightly shorter than that of the dorsal, rough externally, sometimes even with a few serrations near its tip, serrated internally. Ventrals not reaching the anal. Caudal forked. *Colour*—brownish above, bluish on the sides where it is glossed with gold, and of a dull white beneath. Fins with a bluish-black tinge. Young specimens are of a brownish colour, superiorly glossed with purplish and yellow, the fins nearly black.

Hab. From Bombay through the seas of India, entering estuaries and tidal rivers; attaining at least 3 feet in length.

189. (11.) Arius serratus.

Arius serratus, *Day, Fish. India*, p. 462, pl. cv, fig. 3.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 16 (5/11). C. 17.

Length of head $5\frac{1}{4}$, of caudal fin $4\frac{1}{4}$, height of body $5\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the length of head, $1\frac{1}{4}$ diameters from end of snout, and 2 apart. The greatest width of the head equals its length behind the angle of the mouth. Upper jaw the longer, the width of the gape of the mouth equal to half the length of the head. Upper surface of the head granulated or with rough lines, most distinct on the occipital process. The median longitudinal groove on the head does not quite reach posteriorly to above the hind edge of the opercle; from the groove commences a serrated ridge, which is continued along the occipital process. Occipital process with a serrated keel, a little longer than wide at its base. Basal bone narrow and crescent-shaped. *Barbels*—the maxillary reach to the middle of the pectoral fin, the outer mandibular to the gill-opening. *Teeth*—in the palate villiform in three distinct patches on either side, the two vomerine patches round, small, and with an interspace between them, outside each there is another rather longer oval patch; the third or posterior patch is parallel to the one on the opposite side. *Fins*—dorsal higher than the body; its spine, which is serrated on both edges, is as long as the head behind the middle of the eyes, and has a soft termination; the length of the base of the adipose half that of the rayed fin. Pectoral reaching rather above halfway to the ventral; pectoral spine stronger than that of the dorsal, but not quite so long; externally the former is rough in its lower, serrated in its outer half, internally it is denticulated. The ventral does not reach the anal. Upper caudal lobe the longer. *Colour*—upper surface of the head copper-coloured shot with gold, sides silvery. Fins yellowish, rayed dorsal stained with dark in its outer half; adipose fin with a black spot; a dark band, edged with white, along the outer half of the anal; both caudal lobes dark at their extremities.

This fish is nearly allied to *A. thalassinus*, but has much shorter pectoral fins and longer maxillary barbels. Whether the serrations along the occipital ridge are merely due to the specimen being young is questionable.

Hab. Sind.

190. (12.) Arius thalassinus.

Bagrus thalassinus, *Rüpp. N. W. Fische*, p. 75, t. 20, fig. 2.
Arius thalassinus, *Day, Fish. India*, p. 463, pl. civ, fig. 4, and pl. cvi, fig. 1 (see synon.).

B. vi. D. 1/7 | 0. P. 1/12. V. 6. A. 15-17 (3-5/12-13). C. 17.

Length of head $4\frac{1}{2}$ to 5, of caudal fin 5, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—longest diameter obliquely transverse, 5 in the length of the head, $1\frac{1}{2}$ to $1\frac{3}{4}$ diameters from end of snout, and $2\frac{1}{2}$ to 3 apart. Width of head equal to its length behind the angle of the mouth, breadth exceeding the height. Upper surface of the head granulated; the median longitudinal groove, which is narrow posteriorly, extends to opposite the hind edge of the opercle. The occipital process is granulated, keeled, rather longer than wide at its base, and extends to the basal bone of the dorsal fin, which is small and crescentic in shape. *Barbels*—the maxillary extend nearly or quite to the base of the pectoral fin, the outer mandibular are a little shorter. *Teeth*—on the palate villiform, those of each side forming a triangle composed of three patches, two in front and a larger one behind. *Fins*—dorsal spine as long as the head without the snout, or even a little longer, granulated anteriorly (with some serrations in the young), serrated posteriorly; base of adipose dorsal two fifths of that of the rayed fin. Pectoral spine strong, but a little shorter than the dorsal, rough externally, feebly serrated internally; caudal with the upper lobe usually the longer. *Colour*—silvery, darkest superiorly; the upper half of the adipose dorsal black. In some specimens the dorsal surface is of a rich brown, and each of the granules on the head appears to be tipped with gold.

Hab. From the Red Sea, through the seas of Africa and India to the Malay Archipelago and beyond, entering tidal rivers. Attains a large size.

191. (13.) Arius buchanani.

Pimelodus arius, *Ham. Buch. Fish. Ganges*, pp. 170, 376.
Arius buchanani, *Day, Fish. India*, p. 463, pl. cv, fig. 6.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 22 (6/16). C. 17.

Length of head $4\frac{2}{3}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{3}{4}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ in the length of head, $1\frac{3}{4}$ diameters from end of snout, and $2\frac{1}{4}$ apart. Greatest width of the head equal to its length behind the angle of the mouth. Upper jaw the longer, width of gape of mouth three eighths of the length of the head. Median longitudinal groove on the head rather shallow, and not reaching the base of the occipital process. Upper surface of the head lineated in roughened lines, which are rather close together on the occipital process; the latter is scarcely keeled, and as wide at its base as it is long. Opercle higher than wide. *Barbels*—the maxillary extend to the first third of the pectoral fin, the outer mandibular almost to its base. *Teeth*—on the palate in two oval patches, one on either side, each as large as the eye, placed far back and parallel to one another, the teeth have large globular

heads. *Fins*—dorsal higher than the body, its spine as long as the head behind the angle of the mouth, anteriorly roughened in its lower two thirds, and serrated in its upper, posteriorly very feebly serrated; base of the adipose dorsal three fourths of that of the rayed fin. Pectoral reaching the base of the ventral, the spine stronger than that of the dorsal but of equal length, serrated on both sides. Ventral almost reaching the anal; upper caudal lobe the longer. *Colour*—silvery along the back, lighter on the sides and below, pectoral and dorsal edged posteriorly with blackish; adipose dorsal with a well-defined black spot.

Hab. Hooghly at Calcutta; also in Burma.

192. (14.) **Arius falcarius.**

Arius falcarius, *Richardson, Voy. Sulphur, Ich.* p. 134, pl. lxii. figs. 7–9; *Day, Fish. India,* p. 463, pl. cvi, fig. 5 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18–20 (5–6/13–14). C. 17.

Length of head 4 to 5, of caudal fin 6, height of body $5\frac{1}{4}$ to 6 in the total length. *Eyes*—diameter $5\frac{1}{2}$ to 6 in the length of head, $2\frac{1}{4}$ diameters from end of snout, and 3 to $3\frac{1}{2}$ apart. The greatest width of the head equals its length behind the angle of the mouth, and exceeds its height by about one sixth. Upper jaw the longer, the width of the gape of the mouth equal to three sevenths of the length of the head. The median longitudinal groove on the head, which is wide anteriorly, becomes suddenly narrow midway between the front edge of the eye and the hind edge of the opercle, and does not quite reach the base of the occipital process, which is keeled, rather longer than wide at its base, and reaches the basal bone of the dorsal fin, which is V-shaped, narrow, and short. Upper surface of the head behind the eyes (except in the groove) strongly granulated, as is also the occipital process. *Barbels*—the maxillary pair, which are black, reach to the hind edge of the head, the outer mandibular to the gill-opening, while the inner are shorter. *Teeth*—the villiform band in the premaxillaries four times as long as wide; those on the palate granular anteriorly, becoming globular posteriorly, in two elongated subtriangular patches, longer than wide, parallel to one another along the median line, their external edge is convex, anteriorly they nearly reach the premaxillary teeth. *Fins*—dorsal higher than the body, its spine usually ending in a soft point, it equals the length of the head excluding the snout, anteriorly it is serrated in its upper, rough in its lower half, and serrated posteriorly; the base of the adipose fin equals three sevenths of that of the rayed fin. Pectoral spine a little longer than the dorsal, serrated externally in its outer half, rough in its lower; externally it is denticulated; it nearly reaches the ventral, whilst the latter extends to the anal or even to as far as the third ray of that fin. *Colour*—bluish grey above, becoming dull white beneath; fins greyish, dorsal black-tipped; a black blotch on the adipose dorsal, and sometimes one on the anal.

Hab. Calcutta, and seas of India, to China. Very numerous along the Malabar coast.

193. (15.) Arius malabaricus.

Arius malabaricus, *Day, Fish. India*, p. 464, pl. cvii, fig. 4.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 20 (6/14). C. 17.

Length of head $4\frac{1}{4}$, of caudal fin $5\frac{1}{3}$, height of body 5 in the total length. *Eyes*—diameter $6\frac{1}{2}$ in the length of head, $2\frac{1}{2}$ diameters from the end of snout, and $3\frac{1}{2}$ apart. The greatest width of the head equals its length behind the nostrils, it is rather wider than high. Upper jaw the longer, the width of the gape of the mouth equals two fifths of the length of the head. Upper surface of the head sparingly granulated. The median longitudinal groove on the head commences opposite the hind edge of the eyes, it is very narrow and deep, and is continued nearly to the base of the occipital process, which latter is slightly keeled and granulated, as broad at its base as it is long, and emarginate posteriorly to receive the V-shaped basal bone of the dorsal fin. *Barbels*—the maxillary pair black and as long as the head, the outer mandibular pair rather shorter. *Teeth*—in the upper jaw one fourth as wide as long, those on the palate granular and in two elongated oval patches which reach far forwards, and are slightly convergent anteriorly, they extend some distance posteriorly. *Fins*—dorsal spine of moderate strength, as long as the head behind the angle of the mouth, anteriorly granulated in its lower, serrated in its upper portion, posteriorly serrated; base of soft dorsal rather short. Pectoral spine nearly as long as the head, denticulated internally, and extending to below the last dorsal ray. Ventral not quite reaching the anal. *Colour*—silvery, glossed with gold below; adipose dorsal with a black spot in its upper half.

Hab. Canara.

194. (16.) Arius platystomus.

Arius platystomus, *Day, Fish. India*, p. 464, pl. cvii, fig. 3.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 19 (5/14). C. 17.

Length of head 4, of caudal fin $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter 7 in the length of head, 2 diameters from the end of snout, and 4 apart. The greatest width of the head exceeds its height by one third, and is as long as the head without the snout. Upper jaw the longer; the width of the gape of the mouth equal to four sevenths of the length of the head. Median longitudinal groove on head becoming narrow posteriorly, where it just reaches the base of the occipital process, which is strongly keeled, rather longer than wide at its base, with straight lateral edges, and extending to the basal bone of the dorsal fin, which is rather narrow and S-shaped. A very few scattered granulations over the posterior half of the head and the occipital process. *Barbels*—the maxillary reach just beyond the base of the pectoral, the outer

mandibular are not quite so long. *Teeth*—the villiform band in the premaxillaries is six times longer than wide; obtusely conical in the palate in two pyriform patches, rather longer than broad, each placed well forward, and largest anteriorly where the two slightly converge, the interspace equal to two thirds of the diameter of the eye. *Fins*—the dorsal about as high as the body, its spine as long as the head excluding the snout, anteriorly its upper half is serrated, its lower roughened, the whole is serrated posteriorly: the length of the base of the adipose dorsal nearly equals that of the rayed fin. Pectoral spine rather shorter than the dorsal, externally serrated in its anterior, rough in its posterior half, internally it is denticulated, it reaches three fourths of the distance to the ventral. The ventral just reaches the anal. *Colour*—bluish along the back, becoming lighter on the sides and beneath; dorsal, pectoral, and ventral with a slight tinge of grey. No black mark upon the adipose dorsal.

Hab. Canara.

195. (17.) Arius nella.

Pimelodus (?) nella, *Cuv. & Val. H. N. Poiss.* xv, p. 162.
Arius nella, *Day, Fish. India*, p. 465 (see synon.).

Nallah jellah, Tel.

D. 1/7 | 0. P. 1/10. V. 6. A. 19. C. 19.

Head broad, depressed. *Eyes*—small, in front half of the head. *Teeth*—on palate, globular. *Barbels*—the maxillary reach to the middle of pectoral fin. *Fins*—caudal sublunate. *Colour*—head and back bluish leaden; belly, throat, and hinder part of the tail a dull white. The whole trunk strewed with small, obscure, dusky dots. Dorsal, ventral, and anal with blackish margins. Pectoral and caudal glossy with a faint yellowish tinge.

This fish has been placed by Cuvier and Valenciennes amongst those having no teeth in the palate, in consequence of their having misunderstood Russell's description.

Hab. Coromandel coast; growing to $9\frac{1}{2}$ inches in length.

196. (18.) Arius macronotacanthus.

Arius macronotacanthus, *Bleeker, Atl. Ich.* ii, p. 32, t. 55; *Day, Fish. India*, p. 465, pl. cxiii, fig. 1 (see synon.).

B. vi. D. 1/7 | 0. P. 1/9. V. 6. A. 18–19 (6–7/12–13). C. 15.

Length of head 4 to $4\frac{1}{6}$, of caudal fin $6\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $5\frac{1}{4}$ to 6 in the length of head, $1\frac{1}{2}$ diameters from end of snout, and $2\frac{1}{2}$ apart. The width of the head exceeds its height, and equals its length excluding the snout. Extent of the gape of the mouth equal to four ninths of the length of the head. The median longitudinal groove is wide between the eyes, becomes pointed both anteriorly and posteriorly, and does not

reach so far as the base of the occipital process, which latter is as wide at its base as it is long, and reaches a narrow V-shaped basal bone. Upper surface of the head granulated in groups, the occipital process densely so in lines. *Barbels*—the maxillary reach the middle of the pectoral spine, the outer mandibular its base. *Teeth*—on the palate obtusely conical or granular, placed in two pear-shaped patches, each as long as the eye, the large ends posterior and divergent, the anterior terminating near the band on the premaxillaries. *Fins*—dorsal spine strong, very rugose laterally, as long as the head behind the nostrils, and serrated both anteriorly and posteriorly, it has a soft termination; the length of the base of the adipose equals two thirds of that of the rayed fin. Pectoral spine as long as the head excluding the snout, roughened and serrated externally, denticulated internally, it reaches two thirds the distance to the ventral, which does not reach the anal. *Colour*—base of dorsal darkish, a large black blotch on the adipose fin.

Hab. India to Java, Sumatra, and Pinang.

197. (19.) Arius gagora.

Pimelodus gagora, *Ham. Buch. Fish. Ganges*, pp. 167, 376, pl. 10, fig. 54.

Arius gagora, *Day, Fish India*, p. 465, pl. cvii, fig. 2 (see synon.).

Nga-youn, Burmese.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18 (5–6/13–12). C. 17.

Length of head 4 to $4\frac{1}{4}$, of caudal fin $5\frac{1}{2}$ to $5\frac{2}{3}$, height of body $6\frac{3}{4}$ in the total length. *Eyes*—diameter 7 to 8 in the length of head, $2\frac{1}{2}$ diameters from the end of snout, and 3 to $3\frac{1}{2}$ apart. Head one fourth wider than high, its width equal to its length excluding the snout. Upper jaw the longer, the width of the gape of the mouth four elevenths of the length of the head. Most of the occiput and the whole of the occipital process granulated. Median longitudinal groove on the head narrow, rather deep, and reaching nearly to the base of the occipital process, which is keeled, very slightly longer than wide at its base and extending to a narrow V-shaped basal bone. Opercle higher than wide. *Barbels*—the maxillary not quite so long as the head, the outer mandibular reach the gill-opening. *Teeth*—those on the palate with globular heads, in large semi-ovate patches; considerable variation in size and direction of these patches of teeth exists, as it not unfrequently happens that some are wanting. *Fins*—dorsal rather higher than the body, the spine of moderate strength, anteriorly serrated in its upper, rough in its lower half, posteriorly serrated, it is as long as the postorbital portion of the head; length of the base of the adipose dorsal two thirds of that of the rayed fin. Pectoral reaching two thirds of the distance to the ventral; pectoral spine rather stronger than the dorsal, which it equals in length, externally it is serrated, internally denticulated. The ventral does not extend so far as the anal.

Upper caudal lobe the longer. *Colour*—purplish superiorly, becoming dull white beneath; fins externally stained with grey or black, and a blackish spot on the adipose dorsal. *Air-bladder*—large and somewhat heart-shaped. On removing its lower wall a longitudinal septum is seen in its posterior half but not anteriorly. It has three transverse subdivisions, forming it into five chambers, the anterior of which is nearly half the size of the entire organ, and has no longitudinal septum. The four lateral chambers communicate freely with each other on both sides, also anteriorly with the large chamber.

Hab. Seas, estuaries, and tidal rivers of Orissa and Bengal to Siam. It attains $1\frac{1}{2}$ feet (or according to Hamilton Buchanan 3 feet) or more in length; it is commonly seen about 8 or 10 inches long.

198. (20.) **Arius jatius.**

Pimelodus jatius, *Ham. Buch. Fish. Ganges*, pp. 171, 376.
Arius jatius, *Day, Fish. India*, p. 466, pl. cvi, fig. 4 (see synon.).

Nga-youn and *Nga-yeh*, Burmese.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18 (5/13). C. 17.

Length of head $4\frac{1}{4}$, of caudal fin 5, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in the length of head, $1\frac{1}{2}$ diameters from the end of snout, and $1\frac{3}{4}$ to 2 apart. Height of head nearly equal to its width, the latter equal to its length excluding the snout. Upper jaw the longer; the extent of the gape of the mouth equals one third of the length of the head. Summit of the posterior portion of the head sparingly granulated, the occipital process more thickly so. The median longitudinal groove on the head narrow, and continued almost to the base of the occipital process, which latter is keeled, as wide at its base as long, and reaches the narrow V-shaped basal bone of the dorsal fin. Opercle wider than high. *Barbels*—short, the maxillary pair shorter than the head, the outer mandibular pair just reach the gill-opening. *Teeth*—villiform, in a band six times as long as wide in the premaxillaries; on the palate globular, in a small oval patch posteriorly, scarcely exceeding half the diameter of the eye; they may be entirely absent. *Fins*—dorsal as high as the body; dorsal spine strong, as long as the head excluding the snout, serrated on both sides; the base of the adipose dorsal four fifths of that of the rayed fin. Pectoral spine as long as that of the dorsal, serrated externally, denticulated internally, reaching as far as the ventral fin. The latter extends to the anal. *Colour*—dark bluish along the back, becoming lighter on the sides and beneath. Fins yellowish, lower half of dorsal stained with grey. Upper edge deep black. A deep black spot on the upper half of the adipose fin; caudal edged with black, and anal with a dark spot on its edge near the middle.

Hab. Estuaries and rivers of Bengal and Burma, ascending far above tidal reach, and attaining a foot or more in length.

199. (21.) Arius tenuispinis.

Arius tenuispinis, *Day, Fish. India*, p. 466, pl. cvii, fig. 5 (see synon.).

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 18 (5/13). C. 17.

Length of head $3\frac{1}{2}$, of caudal fin $4\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 7 in the length of head, $2\frac{1}{2}$ diameters from end of snout, and $3\frac{1}{2}$ apart. The greatest width of the head equals its length excluding the snout. The extent of the gape of the mouth equal to one third of the length of the head. Median longitudinal groove on the head narrow, and not quite reaching the base of the occipital process, which has a slight keel, is a little longer than wide at its base, and rather convex posteriorly, where it reaches the narrow and V-shaped basal bone of the dorsal fin. A few granulations on the top of the head, also along the middle of the occipital process. *Barbels*—the maxillary reach the end of the head, the outer mandibular are one third shorter. *Teeth*—none on palate. *Fins*—dorsal spine very weak and thin, nearly as long as the head excluding the snout, serrated posteriorly; base of the adipose equal to half that of the rayed dorsal fin. Pectoral spine as long as the dorsal, but slightly stronger, roughened externally, serrated internally. Caudal forked. *Colour*—silvery along the back, becoming lighter on the sides and beneath.

Hab. Bombay, and perhaps Ceylon.

200. (22.) Arius jella.

Arius jella, *Day, Fish. India*, p. 467, pl. cvi, fig. 3 (see synon.).
Deddi jellah, Tel.

B. vi. D. 1/7 | 0. P. 1/10. V. 6. A. 17–18 (4–5/13). C. 19.

Length of head $4\frac{3}{4}$, of caudal fin $5\frac{1}{2}$, height of dorsal fin $5\frac{1}{3}$, of body $6\frac{3}{4}$ in the total length. *Eyes*—diameter 6 in the length of head, 2 to $2\frac{1}{2}$ diameters from the end of snout, and 3 apart. Greatest width of the head one sixth more than its height, and equal to its length behind the nostrils. Upper jaw the longer, the extent of the gape of the mouth three eighths of the length of the head. The median longitudinal groove becomes narrow and deep posteriorly, and reaches nearly to the base of the occipital process, which is slightly keeled, has nearly straight sides and is slightly longer than broad, posteriorly it is a little emarginate and reaches the narrow basal bone of the dorsal fin. Most of the occiput and the occipital process are closely granulated. *Barbels*—the maxillary are nearly as long as the head, the outer mandibular almost reach the gill-opening, the inner are shorter. *Teeth*—globular on the palate in two convex, oblong-ovate patches, which are slightly convergent behind; none on the vomer. *Fins*—dorsal spine of moderate strength, as long as the head excluding the snout, sometimes with a very long soft termination, slightly serrated anteriorly, or merely rough in large specimens, strongly serrated posteriorly.

Pectoral spine stronger than dorsal and rather longer, roughened and slightly serrated externally, denticulated internally. Base of adipose dorsal slightly shorter than that of the rayed fin. Ventral scarcely reaching the anal. Upper caudal lobe the longer. *Colour*—greyish silvery, becoming white on the sides and below. Fins stained grey, with a white outer edge to the anal. Adipose dorsal with a dark blotch.

Hab. Coasts of India.

201. (23.) Arius dussumieri.

Arius dussumieri, *Cuv. & Val. H. N. Poiss.* xv, p. 84; *Day, Fish. India*, p. 467, pl. cvii. fig. 7 (see synon.).

B. vi. D. 1/7 | 0. P. 1/12. V. 6. A. 14–16 (4–5/10–11). C. 17.

Length of head 4 to $4\frac{1}{2}$, of caudal fin 5, height of body 5 in the total length. *Eyes*—diameter $6\frac{1}{2}$ in the length of head, $2\frac{1}{3}$ diameters from the end of snout, and 4 apart. Head one fourth wider than high, its width equals its length excluding the snout, or even behind the angle of the mouth. Upper jaw the longer, the width of the gape of the mouth equals four ninths of the length of the head. Median longitudinal groove shallow, becoming most distinct posteriorly, where it reaches the base of the occipital process, which is strongly keeled and nearly (or quite) as wide at its base as it is long, its lateral edges are nearly straight, and it extends to the basal bone, which is narrow and S-shaped. A few scattered granulations on the posterior portion of the head and over the base of the occipital process. *Barbels*—the maxillary reach just beyond the base of the pectoral, the external mandibular are not quite so long. *Teeth*—obtusely conical on the palate, in four widely separated patches, those on either side of the vomer being smaller than the palatine patches. *Fins*—the dorsal as high as the body, its spine as long as the head excluding the snout, anteriorly in the upper half serrated, in the lower roughened, posteriorly serrated throughout; the length of the base of the adipose dorsal equals half of that of the rayed fin. Pectoral spine rather shorter than that of the dorsal, externally it is serrated in its anterior half, rough in its posterior, internally it is serrated; it reaches two thirds of the way to the ventral. Ventral just reaching the anal. *Colour*—bluish along the back, becoming lighter on the sides and below, fins blackish externally.

Hab. Malabar coast of India and Ceylon.

23. Genus KETENGUS, Bleeker.

Branchiostegals five. Gill-membranes united, not confluent with the isthmus, but having a free posterior edge, which is notched. Upper surface of head osseous. Eyelids with a free circular margin. Cleft of mouth deep; upper jaw the longer. Barbels six, small, no nasal ones. Nostrils approximating, the

posterior provided with a valve. A single row of compressed teeth, which are subtruncated or almost tricuspid in the jaws; palate edentulous. Dorsal fin with one spine and seven rays, inserted nearer the snout than the ventrals are; adipose fin short; anal of moderate length and not continuous with the caudal, which latter is forked. Ventral with six rays. Air-bladder not enclosed in bone. An axillary pore.

Geographical Distribution. Andamans to the Malay Archipelago.

202. (1.) **Ketengus typus.** (Fig. 68.)

Ketengus typus, *Bleeker, Atl. Ich.* ii, p. 44, t. 82, fig. 1; *Day, Fish. India*, p. 468, pl. cviii, fig. 2 (see synon.).

B. v. D. 1/7 | 0. P. 1/7–8. V. 6. A. 19–20 (5–6/14). C. 15.

Length of head $4\frac{3}{4}$, of caudal fin $5\frac{1}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter $5\frac{1}{4}$ in the length of head, $1\frac{1}{4}$ diameters from end of snout, and $2\frac{1}{2}$ apart. The greatest width of the head equals its length excluding the snout. Upper surface of the head, occipital process, and basal bone of the dorsal fin densely granulated.

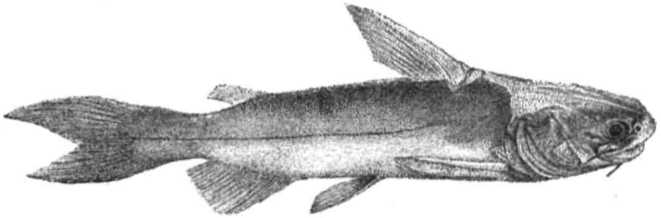

Fig. 68.—*Ketengus typus.*

The width of the gape of the mouth equals the length of the head excluding the snout. Longitudinal groove along the upper surface of the head deep but narrow, commencing on the snout it is not continued so far as to the base of the occipital process which is as long as wide at its base. *Teeth*—as defined in the genus. *Fins*—dorsal spine as long as the head and serrated on both edges; base of the adipose nearly as long as that of the rayed fin. Pectoral spine a little shorter than that of the dorsal and serrated on both edges. *Colour*—silvery.

Hab. The Andamans to the Malay Archipelago.

24. Genus **OSTEOGENIOSUS**, Bleeker.

Branchiostegals five. Gill-membranes united at the throat, emarginate and overlapping the isthmus but not confluent with it; upper surface of the head covered with very thin skin; mouth anterior; upper jaw the longer. Nostrils approximating, the posterior provided with a valve. Barbels, a single semi-osseous maxillary pair. Teeth in the jaws villiform; obtusely conical on

Geographical Distribution. From Beluchistan through the seas, estuaries, and tidal rivers of India to the Malay Archipelago and beyond.

205. (1.) **Batrachocephalus mino.** (Fig. 70.)

Ageneiosus mino, *Ham. Buch. Fish. Ganges*, pp. 159, 375.
Batrachocephalus mino, *Day, Fish. India*, p. 468, pl. cviii, fig. 1 (see synon.).

B. v. D. 1/7 | 0. P. 1/7. V. 6. A. 20 (5/15). C. 15.

Length of head $4\frac{1}{2}$, of caudal fin 5, height of body 6 in the total length. *Eyes*—diameter 4 in the length of head, $\frac{1}{2}$ a diameter from the end of snout, and $1\frac{1}{2}$ apart. The greatest width of the head equals its length behind the middle of the eyes. Gape of mouth wide, the cleft of the mouth reaches to below the centre of the orbit. Occipital process rather longer than wide at its base, and lineated

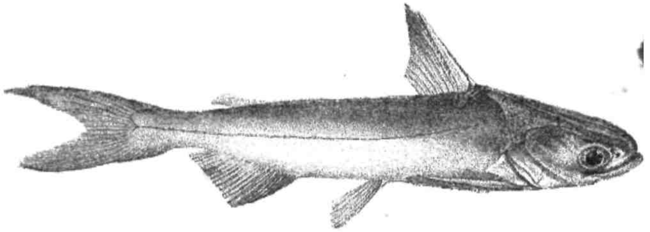

Fig. 70.—*Batrachocephalus mino.*

in roughened lines. Basal bone crescentic and narrow. *Barbels*—minute. *Teeth*—in a broad longitudinal band on the palate. *Fins*—dorsal spine of moderate strength, as long as the head behind the middle of the eyes; base of the adipose dorsal equal to half that of the rayed fin. Dorsal and pectoral spines serrated on both edges. Upper caudal lobe a little the longer. *Colour*—silvery, darkest along the back and upper lobe of the caudal fin.

Hab. Seas, estuaries, and tidal rivers of India and Burma to the Malay Archipelago. Not common, and held in no esteem as food.

26. Genus **AKYSIS.**

Body somewhat elongated; head broad and covered with soft skin. Gill-openings of moderate width, the membrane stretching across the isthmus and being slightly notched posteriorly. Mouth terminal, the upper jaw slightly the longer. Anterior nostrils tubular and widely separated from one another and from the posterior nostrils. Barbels eight. Eyes small. Villiform teeth in the jaws, none on the palate. A short dorsal fin with one spine and five rays; pectorals horizontal, ventral with six rays, caudal emarginate or forked. Lateral line present. Skin tubercular.

Geographical Distribution. These small freshwater forms extend from the Tenasserim Provinces to the Malay Archipelago.

206. (1.) **Akysis pictus.**

Akysis pictus, *Günther, A. M. N. H.* (5) xi. 1883, p. 138; *Day, Fish. India, Supplement,* 1888, p. 806.

D. 1/6 | 0. P. 1/7. V. 6. A. 9.

Head broader than deep. *Eyes*—twice as far from the gill-opening as from the end of the snout. The distance of the anterior nostrils apart equals about half the length of the snout, while the interspace between the anterior and posterior nostril equals half that between the front pair. *Barbels*—nasal half as long as the head, maxillary reaching to the origin of the dorsal fin, the outer mandibular to the axil of the pectoral, the inner are shorter. *Fins*—dorsal commencing midway between the snout and the adipose fin, its spine comparatively strong. Anal arising nearer to the root of the caudal than to that of the pectoral. Caudal emarginate; pectoral extending a little beyond the origin of the dorsal, its spine strong and entire; ventrals reaching the vent. *Colour*—head greyish, with minute black spots; body anteriorly black; this colour is contracted behind into an irregular band that runs along the middle of the posterior part of the body and tail. Dorsal fin with a black band covering all but its front corner and upper edge; caudal and pectoral banded.

Hab. Tenasserim; growing to 45 millim. long (1·8 inches).

27. Genus **BAGARIUS**, Bleeker.

Branchiostegals twelve. Gill-membranes not confluent with the skin of the isthmus, having a free posterior edge and notched halfway to the chin. Head depressed, its upper surface osseous. Mouth anterior; upper jaw the longer. Eyes with free orbital margins. Nostrils approximating, the posterior provided with a barbel. Barbels eight—one nasal, one maxillary, and two mandibular pairs. Teeth in jaws pointed and of unequal size; palate edentulous. Thorax destitute of any adhesive apparatus. First dorsal fin in advance of the ventrals, having one spine and six rays; adipose fin present. Ventral with six rays. Anal of moderate length. Caudal deeply forked. Air-bladder small, consisting of two rounded portions enclosed in bone. An axillary pore.

The air- or swim-bladder of this fish is present, but small. Taylor ('Gleanings in Science,' ii, p. 172) remarks that the *P. bagharia* (*Bagarius yarrellii*) "has also two air-bladders, which closely resemble the former (*Saccobranchus*, &c.) in the argentine tendinous texture of the external coat, and in having no communication with each other or with the alimentary canal. They are situated one on each side of the body, in a deep groove or furrow of the consolidated transverse processes of the cervical vertebræ, and are extremely small in proportion to the bulk of the fish; each of them, in an individual weighing 10 lbs., not exceeding a large garden-pea

in size; they are placed in the middle of the grooves at about an equal distance from the common integuments (immediately behind the pectoral fins) and the vertebral column: the space between each of them and the former being filled up with adipose substance, whilst that next to the spine is occupied by the malleus."

Geographical Distribution. Throughout the course of the larger rivers of the Punjab, India, and Burma, and extending to the Malay Archipelago.

207. (1.) Bagarius yarrellii. (Fig. 71.)

Pimelodus bagarius, *Ham. Buch. Fish. Ganges*, pp. 186, 378, pl. 7, fig. 62.
Bagrus yarrellii, *Sykes, Tr. Z. S.* ii, p. 370, pl. 65, fig. 1.
Bagarius yarrellii, *Day, Fish. India*, p. 495, pl. cxv, fig. 3 (see synon.).

Boonch or *Goonch*, Hind. (N. W. P.); *Goreah*, Assam; *Rahti jellah* Tel.; *Sah-lun*, Ooriah; *Mutauda* and *Tharota*, Maráthi.

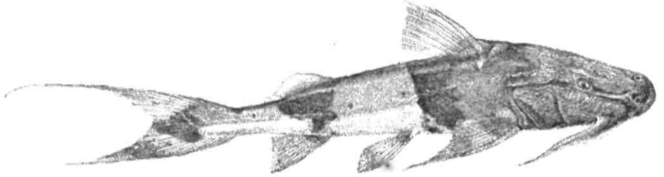

Fig. 71.—*Bagarius yarrellii.*

B. xii. D. 1/6 | 0. P. 1/12. V. 6. A. 13–15 (3/10–12). C. 17.

Length of head $3\frac{3}{4}$, of caudal fin $4\frac{1}{4}$, height of body 5 in the total length excluding the prolonged caudal ray. *Eyes*—small, situated in the middle of the length of the head. The greatest width of the head equals from two thirds of its length in the young to its entire length in the adult, its upper surface is rugose in irregular bands and lines. Upper jaw the longer, the extent of the gape of the mouth equal to four sevenths of the length of the head. *Barbels*—the maxillary with broad bases and rather longer than the head; the nasal pair short. *Teeth*—sharp, and of unequal size in the jaws, an outer widely separated row of larger ones in the mandibles. *Fins*—dorsal spine smooth, with an elongated soft termination, the osseous portion as long as the head excluding the snout; length of the base of the adipose dorsal as long as that of the rayed fin. Pectoral spine stronger than that of the dorsal and equally long, serrated internally, and having a soft prolongation. Caudal deeply forked, its upper lobe prolonged. *Skin*—somewhat scabrous over the summit of the head, and slightly so on the body. *Colour*—body grey or yellowish, with large, irregular, brown or black markings and cross bands. A black base to all the fins, and generally also a dark band across each.

Hab. Large rivers of India and Java, descending to the estuaries.

It attains 6 feet or more in length, and is often termed a "fresh-water shark," partly on account of its voracity, and partly because of its underhung mouth and general ugliness.

This fish takes a live-bait, but is difficult to kill; it is sluggish, goes to the bottom, and it generally escapes by destroying the tackle. Mr. Van Cortland, at the end of 1875, angling at the Okla weir, a few miles below Delhi, killed one which was 5 feet long and weighed 136 lbs.

28. Genus GLYPTOSTERNUM, McClelland.

Syn. *Glyptothorax*, Blyth.

Branchiostegals from six to about ten. Gill-openings rather wide; gill-membranes confluent with the skin of the isthmus, but with their posterior margin remaining free. Head rather depressed and covered with soft skin. Eyes small, subcutaneous. Mouth inferior, transverse, with the upper jaw the longer. Nostrils close together, separated by a barbel. Barbels eight—one nasal, one maxillary, and two mandibular pairs, the maxillary with broad bases. Villiform teeth in the jaws; palate edentulous. Dorsal fin with a spine and six or seven rays; an adipose fin present. Pectoral horizontal, with a strong spine, some of its rays being occasionally plaited inferiorly. An adhesive apparatus, composed of longitudinal plaits, exists between the bases of the two pectoral fins on the chest. Ventral with six rays, situated posterior to the dorsal. Anal with a moderate (9–12) number of rays. Caudal forked. Air-bladder in two lateral portions more or less enclosed in bone.

Geographical Distribution. These fishes are found along the Himalayas and the rivers at their bases from Afghanistan to the extreme east of Assam, also in the Malay Archipelago. They are also present in some rivers in the plains of India, but usually not far removed from hills. They appear especially adapted for strong streams and those of hilly districts.

It is open to question whether some of the following might not more properly be termed varieties than species. Roughness of the external edge of the pectoral spine may exist in species in which the spine is normally smooth.

Synopsis of Indian Species.

A. 11–13. Length of head 5 to 5¼ in the total. Maxillary barbels reach pectoral fin. Pectoral spine rough or smooth externally. Dorsal spine smooth. Brown, with black marks. 1. *G. lonah*, p. 196.

A. 13. Length of head 6 in the total. Maxillary barbels reach the pectoral fin. Chestnut-brown, with two light longitudinal bands.......... 2. *G. trilineatum*, p. 197.

A. 11–12. Width of head two thirds of its length. Adhesive apparatus rather elongated and narrow. Maxillary barbels reach middle of pectoral fin........................ 3. *G. conirostre*, p. 198.
A. 11–12. Pupil of eyes transversely oval. Maxillary barbels reach to below the hind edge of the eye. Skin roughened with small spinate tuberosities .... 4. *G. botium*, p. 198.
A. 11. Pupil of eyes circular. Maxillary barbels reach to below the hind edge of the eyes. Skin looks as if it had scales imbedded in it ...... 5. *G. telchitta*, p. 199.
A. 11. Head $4\frac{3}{4}$ in the total length. Maxillary barbels reach first third of the pectorals.................... 6. *G. striatum*, p. 200.
A. 10–11. Maxillary barbels reach base of pectoral fin. Dorsal spine with serrations on both edges .... 7. *G. madraspatanum*, p. 200.
A. 9–11. Width of head nearly equals its length. Maxillary barbels reach base of pectoral spine. Adhesive apparatus wider than long .... 8. *G. pectinopterum*, p. 201.
A. 9. Upper surface of head with elevated spots. Maxillary barbels as long as the head .... 9. *G. cavia*, p. 202.

208. (1.) Glyptosternum lonah. (Fig. 72.)

Bagrus lonah, *Sykes, Tr. Z. S.* ii, p. 371.
Glyptosternum lonah, *Day, Fish. India*, p. 496, pl. cxiii, fig. 5 (see synon.).

D. 1/6 | 0. P. 1/9. V. 6. A. 11–13 (3–4/8–10). C. 15–17.

Length of head 5 to $5\frac{1}{4}$, of caudal fin 5, height of body 7 in the total length. *Eyes*—slightly behind the middle of the length of the head, the width of the interorbital space equals one third to two sevenths of the length of the head. Width of head nearly or quite equals its length; upper surface rough. Width of gape of mouth $2\frac{1}{2}$ to 3 in the length of the head. Lips not fringed. Occipital process nearly or quite four times as long as broad. Thoracic adhesive apparatus rather elongated, reaching to the first third of the pectoral spine, its plaits are scarcely branched. *Barbels*—the nasal reach halfway to the orbit, the maxillary extend to the base or first third of the pectoral, the outer mandibular pair to the gill-opening, the inner are shorter. *Fins*—dorsal higher than the body, its spine rather slender, enveloped in skin, $1\frac{3}{4}$ to $2\frac{1}{4}$ in the length of the head; adipose dorsal with its base longer than that of the first dorsal, and equal to half the interspace between the two fins. Pectoral spine moderately broad, internally strongly denticulated, externally roughened in some specimens, smooth in others, the fin does not nearly reach the ventral.

Caudal forked. *Caudal peduncle*—twice as long as high in the young, two thirds in the adult. *Colour*—yellowish brown, banded with blackish; fins yellow; dorsal, caudal, and anal with black bands.

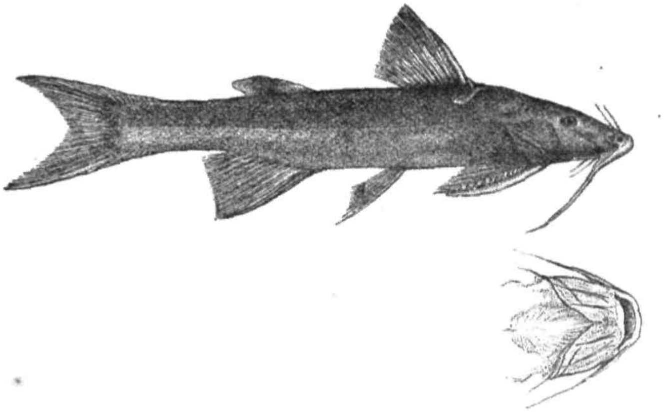

Fig. 72.—*Glyptosternum onah.*

Hab. Deccan, attaining at least 6 inches in length. I have taken this species at Poona, and also in the head-waters of the Jumna.

209. (2.) Glyptosternum trilineatum.

Glyptothorax trilineatus, *Blyth, J. A. S. B.* xxix, 1860, p. 154.
Glyptosternum trilineatum, *Day, Fish. India,* p. 497, pl. cxvi, fig. 3 (see synon.).

D. 1/6 | 0. P. 1/10. V. 6. A. 13 (3/10). C. 19.

Length of head 6, of caudal fin 5½, height of body 6 in the total length. *Eyes*—small, behind or in the middle of the length of the head. Head about as long as broad and covered with soft skin, snout obtuse. Lips not fringed. Occipital process nearly three times as long as broad. *Barbels*—the maxillary reach to the end of the head; nasal barbels nearly to the orbit; the external mandibular pair longer than the internal, and reaching to the base of the pectoral fin. Thoracic adhesive apparatus rather large. *Teeth*—villiform in the jaws, none on the palate. *Fins*—dorsal fin as high as the body, its spine weak, slightly serrated posteriorly, and its bony portion rather above half the length of the head; adipose dorsal of moderate height, its base being equal to more than that of the first dorsal, and to about half the distance between the two fins. Pectoral spine rather broad, denticulated internally, smooth externally, reaching two thirds of the distance to the base of the ventral. Caudal deeply forked. Skin smooth. *Caudal peduncle*—

twice as long as high. *Colour*—chestnut-brown, with a light str along the back, another along the lateral line, and a third near abdominal margin.

Hab. Burma, Tenasserim, and Nepal; attaining 12 inches more in length.

210. (3.) Glyptosternum conirostre.

Glyptosternum conirostre, *Steindachner, Sitzungsb. Ak. Wiss. Wien* lv, 1e Abth. 1867, p. 532, pls. v, vi, figs. 2; *Day, Fish. India*, p. 497 pl. cxvi, fig. 5.

D. 1/6 | 0. P. 1/9. V. 6. A. 11–12 (2/9–10). C. 17.

Length of head $5\frac{1}{4}$, of caudal fin $5\frac{1}{2}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—slightly behind the middle of the length of the head, the width of the interorbital space equals one fourth of the length of the head. The width of the head equals two thirds of its length. Upper jaw the longer; the width of the gape of the mouth equals half of the length of the head. Lips not fringed. Occipital process three times as long as wide. *Barbels*—the maxillary have broad bases and extend to the middle of the pectoral fin; the nasal, which have a very wide fringe, reach the hinder edge of the eye; the outer mandibular, which are also broad, to the gill-openings; the inner are shorter. *Teeth*—generic. *Fins*—dorsal as high as the body or rather higher, its spine strong, as long as the head behind the nostrils and smooth, serrated posteriorly in some specimens; length of the base of the adipose dorsal exceeding that of the rayed fin, and equal to two thirds of the extent of the interspace between the two fins. Pectoral reaching nearly to the ventral, the spine strong, as long as that of the dorsal, not striated inferiorly, and having about 13 denticulations internally. Ventral does not quite reach the anal. Caudal forked. Adhesive apparatus in the chest rather broad, horseshoe-shaped, convex in front, with a large smooth space inside. Caudal peduncle about as high at its base as it is long. *Colour*—brownish, fins yellow, stained with black.

This fish has a considerable similarity to *G. pectinopterum*, but possesses a wider mouth, a narrower head, broader barbels, a higher caudal peduncle, and a more elongated adhesive apparatus.

Hab. Himalayan streams. Specimens from Kangra have the pectoral spine serrated externally.

211. (4.) Glyptosternum botium.

Pimelodus botius, *Ham. Buch. Fish. Ganges*, pp. 192, 378.
Glyptosternum botia, *Day, Fish. India*, p. 497, pl. cxiii, fig. 4 (see synon.).

D. 1/6 | 0. P. 1/8. V. 6. A. 11–12 (2/9–10). C. 18.

Length of head $5\frac{1}{4}$, of caudal fin $4\frac{1}{2}$, height of body $6\frac{1}{2}$ in the length. *Eyes*—pupils transversely oval, small, situated in commencement of the front half of the head; the width of interorbital space, which is convex, equal to

of the head. The greatest width of the head equals its length excluding the snout. Upper jaw the longer; the width of the mouth equals one third of the length of the head. *Barbels*—eight, the maxillary reach to below the hind edge of the eyes, the nasal halfway to the orbits, the mandibular pairs are short. *Teeth*—villiform in the jaws. *Fins*—dorsal spine smooth, as long as the head excluding the snout; length of the base of the adipose fin equal to one third of the interspace between the two fins. Pectoral reaching two thirds of the distance to the ventral, the spine strong, as long as the head excluding the snout, and with about twenty strong teeth internally. Ventral reaching the anal. Caudal deeply lobed, lobes of equal length. Adhesive apparatus well-marked. *Skin*—roughened with small spiny tuberosities arranged in longitudinal rows all over the body. Free portion of the tail twice as long as high at its base. *Colour*—brownish, intermixed with yellow, and blotched with blackish. Fins yellow with black marks and spots.

This fish very closely resembles *G. telchitta*, but has a more roughened skin, whilst the profile of the eye is transversely oval. Hamilton Buchanan (MSS.) observes of this species in the Rangpur district, "the *Bhot Mágur* of the Dharka if possible is still uglier (than the *Erethistes conta*). The people of Bhutan are said to be remarkably fond of it, from whence its name is derived. The people of Behar will not eat it."

Hab. It is common at Delhi. Hamilton Buchanan observed that it was from the northern rivers of Bengal, and attained 6 inches in length.

212. (5.) Glyptosternum telchitta.

Pimelodus telchitta, *Ham. Buch. Fish. Ganges*, pp. 185, 378.
Glyptosternum telchitta, *Day, Fish. India*, p. 498, pl. cxvi, fig. 2 (see synon.).

Gooacherah, Beng.; *Telliah*, Hind. (N. W. P.).

B. vi. D. 1/6 | 0. P. 1/8. V. 6. A. 11 (2/9). C. 17.

Length of head $5\frac{1}{4}$ to $5\frac{3}{4}$, of caudal fin $5\frac{3}{4}$, height of body $7\frac{1}{2}$ to 8 in the total length. *Eyes*—small, with a circular pupil situated in the middle of the length or in the commencement of the posterior half of the head; interorbital space flat, its width $3\frac{1}{2}$ to 4 in the length of the head. The greatest width of the head equals three fourths of its length. Upper jaw the longer, the width of the gape of the mouth equals one third of the length of the head; lips not fringed. Opercle ends posteriorly in an elongated pointed termination; occipital process three times as long as wide at its base. *Barbels*—the nasal very short, the maxillary reach to rather behind the posterior edge of the orbit; the outer mandibular pair reach the gill-opening, the internal are shorter. *Teeth*—generic. *Fins*—dorsal nearly as high as the body, the spine, which is four sevenths as long as the head, has a soft continuation, is slightly enveloped in skin and entire; adipose dorsal of moderate height, the extent

entire; pectoral spine strong and serrated internally; caudal lobed. *Colour*—body diaphanous, having along either side two stripes spotted with black.

Judging from the mandibular barbels and general structure of this fish, it would appear to be a *Gagata*, whilst it is observed "there is no *slit* under the throat."

Hab. River Teesta: attaining 3 inches in length.

225. (4.) Gagata tengana.

Pimelodus tengana, *Ham. Buch. Fish. Ganges*, pp. 176, 377, pl. xxxix, fig. 58.

Gagata tengana, *Day, Fish. India*, p. 493 (see synon.).

B. vi. D. 1/7 | 0. P. 1/8. V. 6. A. 14 (4/10). C. 15.

Length of head 4, of caudal fin 4, and height of body 4 in the total length. *Eyes*—of moderate size, situated nearer to the snout than to the posterior end of the opercle. Back rather prominent. Width of the head equal to its height, or to its length excluding the snout. Mouth small, upper jaw slightly the longer. Median longitudinal groove on the head lanceolate and extending to the base of the occipital process, which is twice as long as it is wide at the base, and reaches the basal bone of the dorsal fin. *Barbels*—the nasal reach the hind edge of the orbit, and all the remainder are shorter than the head. *Fins*—the first dorsal cut obliquely, its spine smooth. Pectoral spine serrated internally. *Colour*—body diaphanous, having a gloss of gold on the sides. On the back are many black dots which are collected into a blotch above the pectoral fin, and another blotch exists on the crown of the head. Dorsal and caudal fins dotted, edges nearly black.

This fish, which is found in Assam, agrees with *G. cenia* except that the nasal barbels are described and shown as being much longer, and the colour differs.

Hab. Brahmaputra river; attaining to about 3 inches in length.

32. Genus NANGRA, Day.

Branchiostegals five or six. Gill-openings rather wide, and not adherent or only slightly adherent to the skin of the isthmus. Thorax smooth. Upper surface of the head with sharp longitudinal ridges and covered by thin skin. Eyes subcutaneous. Snout overhanging the mouth, which is transverse. Nostrils close together, the anterior rounded, the posterior with a barbel. Barbels eight—one pair nasal (which may be rudimentary), one maxillary and two mandibular pairs, the inner of which last are anterior to the external pair. Villiform teeth in jaws; palate edentulous. First dorsal fin with one spine and six to eight rays; adipose of moderate length. A pectoral spine. Ventral with six rays situated farther back than the dorsal. Anal with a moderate number

of rays (10–12). Caudal forked. Air-bladder in two rounded portions each of which is enclosed in bone.

Geographical Distribution. Small fishes found in the Indus, Jumna, Ganges, and Bengal rivers.

This genus differs from *Gagata* in its barbels not being placed in a transverse line behind the chin; and in its gill-membranes not being confluent with a broad isthmus but rather deeply notched. It is allied in some respects to *Macrones*, but has no teeth on the palate, whilst its air-bladder is enclosed in bone.

Synopsis of Indian Species.

D. $\frac{1}{8}$, A. 10–11. Muddy colour	1. *N. buchanani*, p. 211.
D. $\frac{1}{6}$, A. 11–12. Coppery, glossed with gold and having black blotches..............	2. *N. punctata*, p. 212.
D. $\frac{1}{6}$, A. 11. Two greenish bands descend from the back.......................	3. *N. viridescens*, p. 212.

226. (1.) **Nangra buchanani.**

Pimelodus nangra, *Ham. Buch. Fish. Ganges*, pp. 193, 378, pl. xi, fig. 63.

Nangra buchanani, *Day, Fish. India*, p. 494, pl. cxiii, fig. 3 (see synon.).

D. 1/8 | 0. P. 1/9. V. 6. A. 10–11 (2–3/8–9). C. 17.

Length of head and caudal fin from 4½ to 5, height of body 6 in the total length. *Eyes*—rather high up, in the anterior half of the head and covered with skin, 1¼ diameters from the end of snout. The greatest width of the head equals its length excluding the snout. Upper jaw considerably the longer, snout rather depressed, mouth wide. Median longitudinal groove deep, extending to the occipital process up which it is continued; the occipital process three times longer than wide at its base and extending to the basal bone of the dorsal fin. *Barbels*—the nasal longer than the head, the maxillary reach the vent, or even the end of the anal fin, the outer mandibular the base of the ventral and the inner (which arise farther forward than the outer pair) the base of the pectoral. *Teeth*—none on the palate. *Fins*—dorsal spine weak and entire, half as long as the head in the very young, longer in larger specimens; the length of the base of the adipose dorsal equals that of the anal, or the interspace between the commencement of the adipose and the end of the base of the rayed fin; pectoral spine moderately strong, with nine coarse denticulations internally, and as long as the head without the snout; caudal deeply forked, lobes of equal length and pointed. *Air-bladder*—in two oval portions, each of which is enclosed in a thin bony capsule which has a round orifice on the outer side. *Colour*—muddy, with three indistinct vertical greenish half-bands.

Hab. Ganges, Jumna, and Indus; attaining two inches in length.

227. (2.) **Nangra punctata.** (Fig. 76.)

Nangra punctata, *Day, Fish. India*, p. 494, pl. cxv, fig. 8.

B. v. D. 1/6 | 0. P. 1/8. V. 6. A. 11–12 (3-4/8). C. 18.

Length of head 4, of caudal $5\frac{1}{4}$, height of body $6\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the length of head, $1\frac{1}{2}$ diameters from the end of snout, and $1\frac{1}{4}$ apart. The greatest width of the head is equal to its length behind the angle of the mouth. Snout compressed, overhanging the mouth, which is transverse. Gill-

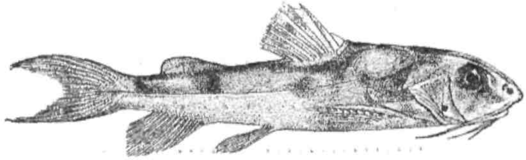

Fig. 76.—*Nangra punctata.*

openings rather wide, the skin not confluent with that of the isthmus. The median longitudinal groove on the head deep, with raised sides, extending to the base of occipital process, which is four times as long as wide, and almost reaches the basal bone. Osseous processes from back of skull and above base of pectoral fin well developed. *Barbels*—the maxillary reach the base of the pectoral spine; the mandibular are shorter than the head, the internal pair placed anterior to the external pair. The nasal pair are rudimentary or wanting *Teeth*—those in the upper jaw placed in front of those in the lower jaw. *Fins*—dorsal spine strong, smooth, half as long as the head. Pectoral spine very strong, as long as the head behind the angle of the mouth, and with about twelve denticulations internally; it is roughened in its lower half externally. *Colour*—coppery, glossed with gold on the sides; a black blotch on the occiput, and three or four along the back descending halfway down the sides. A black band on the dorsal, and some black markings on the caudal.

This fish in appearance is very similar to the young of *Gagata cenia*, but may be at once recognized by the position of the barbels and the broader head.

Hab. The Sone river at Beerbhoom, in Bengal.

228. (3.) **Nangra viridescens.**

Pimelodus viridescens, *Ham. Buch. Fish. Ganges*, pp. 173, 377, pl. xi, fig. 56.
Nangra viridescens, *Day, Fish. India*, p. 494, pl. cxv, fig. 7 (see synon.).

Huddah, Hind.

D. 1/6 | 0. P. 1/8. V. 6. A. 11 (2/9). C. 21.

Length of head 4 to $4\frac{1}{4}$, of caudal 5, height of body 6 in the

total length. *Eyes*—diameter 4 in the length of the head, 1¼ diameters from the end of snout, and 1 apart. The greatest width of the head equals its length behind the angle of the mouth. Snout overhanging the mouth, which is transverse. Gill-openings wide, the membranes being notched. Median longitudinal groove on the head deep, having raised edges, and reaching the base of the occipital process, which latter is three times as long as wide, and does not quite reach the basal bone. Osseous processes from occiput and over base of pectoral fin well developed. *Barbels*—the maxillary reach the root of the pectoral spine; the inner mandibular pair are anterior to the external pair. *Teeth*—none on the palate. *Fins*—dorsal spine strong, smooth, and half as long as the head. Pectoral spine strong, externally rough in its lower half, denticulated internally. *Colour*—glossy greenish brown on the back, with two very light green bands, passing one from the base of each dorsal fin to the middle of the depth of the body. A dark band on the dorsal fin, and spots on either lobe of the caudal.

Hab. Rivers of Northern Bengal, not uncommon in the Jumna at Delhi, and also found at Poona in the Deccan.

Family IV. CYPRINIDÆ.

Branchiostegals three; pseudobranchiæ generally present. Body oblong or elongate; abdomen usually rounded, but, if compressed and cutting, destitute of ossicles. Margin of the upper jaw formed by the premaxillaries. Opercles in four pieces. Mouth toothless, but from one to three rows of teeth in the inferior pharyngeal bones, which latter are strong, free, and parallel to the branchial arches. A single, rayed dorsal fin. Head scaleless; body scaled or scaleless, never covered by osseous plates. No "cul-de-sac" to the stomach, nor pyloric appendages. Air-bladder, if present, large; it may be divided into two lateral portions partially or entirely enclosed in a bony capsule (*Cobitidinæ*); or by a constriction into an anterior and posterior portion, neither of which is enclosed by bone (*Cyprininæ*).

Geographical Distribution. Fresh waters of the Old World and North America.

Carps (*Cyprinidæ*) are well represented in the fresh waters and estuaries of India; Ceylon, and Burma, as they and the *Siluridæ* compose the great mass of fish residing there, especially if we omit the migratory *Clupeidæ*. Whereas Siluroids, as a rule, appear to prefer muddy water, carps thrive best in those which are clear; still many species of this family obtain their subsistence in dirty waters, for which purpose their barbels may prove of considerable assistance. There are few members of this family which are such foul feeders as the Siluroids, consequently carps may be deemed more wholesome and would be greatly preferable as food were it not for the

numerous bones with which they are provided. Natives, however, do not seem to object much to this, and as these fish are very abundant in places, they enter largely into the diet of the indigenous population.

Indian carps do not appear to restrict themselves so much to a vegetable diet as do those in Europe. Those which prey upon their neighbours, as might be anticipated, are largely represented; whilst those small forms that were apparently produced to be preyed upon are the most prolific.

Synopsis of Indian Subfamilies.

Air-bladder enclosed partially or entirely in a bony capsule	*Cobitidinæ.*
Air-bladder not enclosed in bone, and sometimes absent	*Cyprininæ.*

A. Subfamily COBITIDINÆ.

Pseudobranchiæ absent. Body elongate, oblong, compressed, or cylindrical, but never depressed. Snout and lips fleshy. Mouth small, inferior, and furnished with from six to twelve barbels. Pharyngeal teeth few, and in one row. Vertical fins spineless. Dorsal fin with a varying number of rays (8–30); anal with few (7–8); ventrals present or absent. Scales small and cycloid when present, and usually immersed in mucus; rarely present on the head*. Lateral line single. Air-bladder entirely or partially enclosed in a bony capsule.

Geographical Distribution. Loaches are found in tanks and rivers throughout the hills and plains of India and Burma, but apparently are absent from the Andaman Islands. These fish are mostly taken by baling out tanks commencing to dry up, but as they move about in the mud, they are usually difficult to capture.

Synopsis of Indian Genera.

A. An erectile spine near the orbit.

Barbels 6 to 8; 4 rostral, 2 maxillary, and sometimes 2 mandibular. Spine suborbital. Dorsal fin (10 to 15 rays) commencing before the ventral; caudal forked	1. BOTIA.
Barbels 8; 2 mandibular. Spine before the orbit. Dorsal fin (12 rays) opposite the ventrals; caudal forked....	2. ACANTHOPSIS.

* *Lepidocephalichthys* has scales upon its sub- and post-orbital regions, as well as on the upper portion of the opercles.

Barbels 6; none on mandibles. Eyes prominent. Spine suborbital. Dorsal fin (10 rays) commences slightly behind the ventrals; caudal entire..	3. SOMILEPTES.
Barbels 8 or more; 4 rostral, 2 maxillary, the rest mandibular. Spine suborbital. Dorsal fin short, commencing nearly opposite the ventrals; caudal entire or slightly emarginate. Scales on the head	4. LEPIDOCEPHALICHTHYS.
Barbels 6; 1 rostral and 2 maxillary pairs. Spine suborbital. Dorsal fin short, in the last third of the body, but before the anal; ventrals present.	5. ACANTHOPHTHALMUS.
Barbels 8; 1 rostral, 2 maxillary, and 1 mandibular pairs. Spine suborbital. Dorsal fin short (8 rays), in the last third of the body, but before the anal; no ventrals	6. APUA.
Barbels 8, 2 being mandibular. Spine suborbital. Dorsal fin long (30 rays), commencing before the ventral	7. JERDONIA.

B. No erectile spine near the orbit.

Barbels 6; 2 pairs rostral, 1 maxillary. Snout elongate. Eyes elevated. Dorsal fin of moderate length (13 rays), above the ventrals; caudal forked	8. NEMACHILICHTHYS.
Barbels 6; 2 pairs rostral, 1 maxillary. Dorsal of moderate length or short (8 to 17 rays), commencing opposite the ventrals	9. NEMACHILUS.

1. Genus **BOTIA**, Gray.

Syn. *Hymenophysa* and *Schistura*, McClelland; *Diacanthus*, Swainson; *Syncrossus*, Blyth.

Body oblong, compressed, with the dorsal profile more or less elevated. Eye with a free, circular eyelid. Barbels six to eight; four on the snout united at their bases, two on the upper jaw; when there are eight the extra pair are on the mandibles. A bifid, erectile, suborbital spine present. Dorsal fin commencing before the root of the ventral; caudal forked. No scales on the head. Air-bladder in two divisions, the anterior partially enclosed in a bony capsule, whilst the posterior portion is free in the abdominal cavity.

Geographical Distribution. Found throughout the valley of the Ganges, the Sind hills, the Himalayas, Assam, and Burma to the Malay Archipelago.

Synopsis of Indian Species.

D. 15. A. 7. Barbels 6	1. *B. nebulosa*, p. 216.
D. 12–13. A. 7–8. Barbels 8	2. *B. dario*, p. 216.
D. 12. A. 7. Barbels 8	3. *B. geto*, p. 216.
D. 11–12. A. 7–8. Barbels 8	4. *B. almorhæ*, p. 217.
D. 13–15. A. 7. Barbels 8	5. *B. berdmorei*, p. 217.
D. 10. A. 7. Barbels 8	6. *B. histrionica*, p. 218.

229. (1.) Botia nebulosa.

Botia nebulosa, *Blyth, J. A. S. B.* xxix, 1860, p. 165; *Day, Fish. India*, p. 606 (see synon.).

B. iii. D. 15 (3/12). P. 13. V. 8. A. 7 (2/5). C. 17.

Length of head 5, of caudal fin 5, height of body 5 in the total length. *Eyes*—in middle of length of head, 2 diameters from end of snout and the same apart. *Barbels*—two rostral pairs extending to the anterior margin of the orbit: the maxillary are slightly longer. *Fins*—caudal lobes slightly rounded. *Scales*—small. *Colour*—brownish, with a leaden band along the side. Dorsal and caudal barred in spots. An ocellus at the upper margin of the base of the caudal fin.

Hab. Darjeeling.

230. (2.) Botia dario.

Cobitis dario, *Ham. Buch. Fish. Ganges*, pp. 354, 394, pl. xxix, fig. 95.
Botia dario, *Day, Fish. India*, p. 606, pl. cliv, fig. 1 (see synon.).

Sahinga, Punj.; *Bucktea*, Hind.

B. iii. D. 12–13 (3/9–10). P. 14. V. 8. A. 7–8 (2/5–6). C. 19.

Length of head 4½ to 5, of caudal fin 5, height of body 4½ to 5 in the total length. *Eyes*—in about the middle of length of head, 5 diameters in the length of the head, 2 to 2½ diameters from the end of snout, and 2 apart. Suborbital spine reaching to below the hind edge of the eye. *Barbels*—eight. *Scales*—very indistinct. *Colour*—seven or eight oblique bands descend from the back to the abdomen, and two or three, or even more, cross the lobes of the caudal fin.

Hab. Bengal, N.W. Provinces, Assam, and Cachar.

231. (3.) Botia geto. (Fig. 77.)

Cobitis geto, *Ham. Buch. Fish. Ganges*, pp. 355, 394, pl. xi, fig. 96.
Botia geto, *Day, Fish. India*, p. 606, pl. cliv, fig. 2 (see synon.).

Shee-nharo, Sind.

B. iii. D. 12 (3/9). P. 14. V. 8. A. 7 (2/5). C. 19.

Length of head 5¼, of caudal fin 5, height of body 5 to 5¼ in the total length. *Eyes*—diameter 7 in the length of head, 4 diameters

from end of snout. *Barbels*—eight. *Fins*—the caudal has sharp lobes. *Colour*—body in the adult with irregular and partly

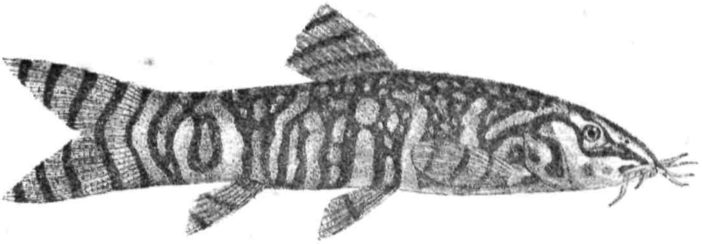

Fig. 77.—*Botia geto.*

confluent brown cross bands, which enclose variously sized round yellowish or bluish spots. Ventral fin with two, the other fins and each lobe of the caudal with three black cross bands. In the *young* the bands on the body form arches, four or five in number, passing over a dark vertical band or mark.

Hab. From Sind, through the Punjab, Himalayas, valley of the Ganges, Jumna, and Sone rivers to Assam.

232. (4.) Botia almorhæ.

Botia almorhæ, *Gray, Zool. Misc.* 1831, p. 8; *Day, Fish. India*, p. 607, pl. cliv, fig. 5 (see synon.).

B. iii. D. 11–12 (2/9–10). P. 14. V. 8. A. 7–8 (2/5–6). C. 19.

Length of head $4\frac{1}{2}$, of caudal fin 5, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—rather behind the middle of the length of the head. *Barbels*—eight. *Colour*—body reticulated with grey on a yellow ground; fins yellow; the dorsal, pectoral, and anal with four transverse dark bands, the pectoral and each caudal lobe with five. Sometimes examples are vertically banded, each band being reticulated.

Hab. Kashmir, Almora, and Khasi hills; attaining 6 inches in length.

233. (5.) Botia berdmorei.

Syncrossus berdmorei, *Blyth, J. A. S. B.* xxix, 1860, p. 166.
Botia berdmorei, *Day, Fish. India*, p. 607, pl. cliv, fig. 3 (see synon.).

Nga-tha-lay-doh and *Shoay-zagay*, Burmese.

B. iii. D. 13–15 (2/11–13). P. 13. V. 8. A. 7 (2/5). C. 17.

Length of head $4\frac{2}{3}$ to 5, of caudal fin 5, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—in about the middle of the length of the head. *Barbels*—eight, the four rostral united at the base. *Colour*—buff, with 10 or 11 vertical darkish bands, extending from the back

to the abdomen. Head likewise banded, and a dark line from the eye to the snout. Numerous oblong blotches over the body, sometimes commencing opposite the orbit and ceasing about the end of the pectoral fin, in other examples continued all over the body. Dorsal fin with three or four rows of spots, and sometimes a large one at the base of the last three or four rays; caudal with five or six; anal with two.

Hab. The Irrawaddy river in Burma, and waters in its vicinity, certainly as high as Mandalay; also Tenasserim.

234. (6.) Botia histrionica.

Botia histrionica, *Blyth, J. A. S. B.* xxix, 1860, p. 166; *Day, Fish. India*, p. 607, pl. cliv, fig. 4 (see synon.).

B. iii. D. 10 (2/8). P. 15. V. 8. A. 7 (2/5). C. 19.

Length of head 5, of caudal fin 5, height of body $4\frac{2}{3}$ in the total length. *Eyes*—small, diameter one sixth of length of head, $2\frac{1}{2}$ diameters from end of snout, 2 diameters apart. *Barbels*—eight. *Fins*—caudal deeply forked. *Colour*—olive, with five dark vertical bands on the body, and two on the head. All the fins with two broad brown bars.

Hab. Burma.

2. Genus ACANTHOPSIS, v. Hasselt.

Syn. *Prostheacanthus*, Blyth.

Body very elongate, snout long and compressed. Barbels eight, two being mandibular. A small, bifid, erectile spine, situated in advance of the orbit. Dorsal fin opposite to the ventrals; caudal forked.

Geographical Distribution. Burma to the Malay Archipelago.

235. (1.) Acanthopsis chœrorhynchus. (Fig. 78.)

Cobitis choirorhynchos, *Bleeker, Batavia, Nat. Tijdsch.* vii, p. 95.
Acanthopsis choirorrhynchus, *Day, Fish. India*, p. 608, pl. clv, fig. 1 (see synon.).

Nga-tha-lay-doh, Burmese.

B. iii. D. 11 (2/9). P. 11. V. 7. A. 8 (3/5). C. 11.

Length of head 5, of caudal 6, height of body 9 in the total

Fig. 78.—*Acanthopsis chœrorhynchus.*

length. *Eyes*—diameter one sixth of the length of head, 4 diameters from the end of snout. *Barbels*—eight, all short. *Fins*—

dorsal commences slightly in advance of the ventral. Caudal lobed, the lower slightly the longer. *Colour*—brownish, with 12 bands across the back, and the same number of blotches along the lateral line; two rows of blotches along the dorsal, and three across the anal fin.

Hab. Burma, and the eastern portion of Sumatra. Col. Tickell says it attains a foot in length in the hill-streams of Burma.

3. Genus **SOMILEPTES** (Swainson), Bleeker.

Body elongate and compressed, dorsal profile nearly horizontal; snout elongate. Eyes prominent. Six barbels—four on the snout, and two on the upper jaw. A small erectile, bifid, suborbital spine. Dorsal fin inserted slightly behind the ventral; caudal entire.

Geographical Distribution. From Orissa through Bengal to Assam.

236. (1.) **Somileptes gongota.** (Fig. 79.)

Cobitis gongota, *Ham. Buch. Fish. Gang.* pp. 351, 394.
Somileptes gongota, *Day, Fish. India,* p. 608, pl. clv, fig. 2 (see synon.).

Reetah, Assam.

B. iii. D. 10 (2/8). P. 10. V. 7. A. 7 (2/5). C. 16.

Length of head $5\frac{1}{4}$ in the total length. *Eyes*—rather behind the middle of the length of the head. Snout with its upper edge rather concave, it and the rest of the head covered with fine warty excrescences. *Barbels*—rather short, extending nearly halfway to

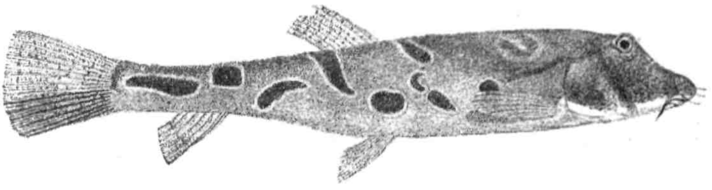

Fig. 79.—*Somileptes gongota.*

below the eyes. *Fins*—caudal entire. *Colour*—an undulating band along the side of the body, giving off vertical bars towards the back, or else oblique blotches with light edges descending from the back or placed irregularly on the body. Dorsal and caudal fins with transverse rows of blackish dots.

Hab. Beerbhoom, Assam, and Khasi hills.

4. Genus **LEPIDOCEPHALICHTHYS**, Bleeker.

Syn. *Platacanthus*, Day; *Misgurnus*, sp., Günther.

Body elongate and moderately compressed, back not elevated. Six or eight barbels, four of which belong to the mandibles. A large, erectile, bifid, suborbital spine. The sub- and post-orbital regions, and also the upper part of the opercle scaled. Dorsal fin short, commencing opposite, or nearly so, to the ventral; the internal ray of the pectoral fin may be modified into a flat osseous spine; caudal truncate or slightly emarginate.

This genus is separated from *Cobitis* not only by the mandibular flap being provided with barbels, but also by the existence of scales on the head, in the sub- and post-opercular regions.

Geographical Distribution. India, Burma, Ceylon, and the Malay Archipelago.

Synopsis of Indian Species.

25 to 30 rows of scales between the base of the anal fin and back..............	1. *L. guntea*, p. 220.
30 to 40 rows of scales between base of anal fin and back	2. *L. thermalis*, p. 221.
About 40 rows of scales between base of anal fin and back	3. *L. berdmorei*, p. 221.

237. (1.) **Lepidocephalichthys guntea.** (Fig. 80.)

Cobitis guntea, *Ham. Buch. Fish. Ganges*, pp. 353, 394.
Lepidocephalichthys guntea, *Day, Fish. India*, p. 609, pl. clv, fig. 4 (see synon.).

Kondaturi and *Jupkari*, Ooriah.

B. iii. D. 8–9 (2/6–7). P. 8. V. 7–8. A. 7 (2/5). C. 16. L.l. ca. 115.

Length of head $6\frac{1}{2}$ to $6\frac{3}{4}$, height of body $5\frac{3}{4}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter one fifth of length of head, $1\frac{1}{2}$ diameters

Fig. 80.—*Lepidocephalichthys guntea.*

from end of snout, and 1 diameter apart. *Barbels*—two rostral and one maxillary pair, all longer than the orbit. *Fins*—caudal

generally entire, its median rays, however, may be somewhat shortened or even lengthened. Inner pectoral ray sometimes modified into a flat spine having a branched termination. *Scales*—25 to 30 rows between the base of the anal fin and the back. *Colour*—generally dirty yellowish, with a light band extending from the centre of the snout, and ending in a black ocellus above the middle of the base of the caudal fin; below this band are a series of dark blotches festooned inferiorly, whilst the back is similarly marked. Dorsal and caudal with numerous rows of dark spots, but only about four on the caudal in Deccan examples, and often two rows on the anal fin.

The variety, *L. balgara* (Fishes of India, pl. clvi, fig. 12), (*Jubbi cowri*, Ooriah), closely resembles the above, but has its body a little more elongated, and its caudal fin is sometimes cut rather more square; in a few examples the ventral fin is slightly in advance of the dorsal, but not so in others.

Hab. Punjab, throughout India (except Mysore and south of the Kistna, and also the Malabar coast). I have specimens from Darjeeling, and several localities on the Himalayas.

238. (2.) **Lepidocephalichthys thermalis.**

Cobitis thermalis, *Cuv. & Val. H. N. Poiss.* xviii, p. 78.
Lepidocephalichthys thermalis, *Day, Fish. India*, p. 610, pl. clv, fig. 3 (see synon.).

Assaree, Tam.; *Jubbi cowri*, Ooriah; *Bálu*, Hind.; *Chickani* and *Mura*, Maráthi.

B. iii. D. 8 (2/6). P. 7. V. 7. A. 7 (2/5). C. 16.

Length of head $5\frac{1}{2}$ in the total length. *Eyes*—almost entirely in the anterior half of the head. *Barbels*—eight, the longest extending to below the anterior margin of the orbit. *Fins*—caudal slightly emarginate. The inner pectoral ray is modified in some adult males into a flat osseous spine which is used for diving down into the mud. *Scales*—distinct, about 30 rows between the base of the anal fin and the back. *Colour*—sandy, with irregular blotches on the lateral line, and others along the back; a black spot generally exists at the base of the upper half of the caudal fin. Dorsal fin with black spots or bars, caudal with four bands. A dark streak often extends from the eye to the end of the snout.

Hab. Southern India, the Malabar coast, the Wynaad, and Ceylon.

239. (3.) **Lepidocephalichthys berdmorei.**

Acanthopsis berdmorei, *Blyth, J. A. S. B.* xxix, 1860, p. 168.
Lepidocephalichthys berdmorei, *Day, Fish. India*, p. 610, pl. cliii, fig. 3 (see synon.).

Nga-tha-lay-doh, Burmese.

4. Genus LEPIDOCEPHALICHTHYS, Bleeker.

Syn. *Platacanthus*, Day; *Misgurnus*, sp., Günther.

Body elongate and moderately compressed, back not elevated. Six or eight barbels, four of which belong to the mandibles. A large, erectile, bifid, suborbital spine. The sub- and post-orbital regions, and also the upper part of the opercle scaled. Dorsal fin short, commencing opposite, or nearly so, to the ventral; the internal ray of the pectoral fin may be modified into a flat osseous spine; caudal truncate or slightly emarginate.

This genus is separated from *Cobitis* not only by the mandibular flap being provided with barbels, but also by the existence of scales on the head, in the sub- and post-opercular regions.

Geographical Distribution. India, Burma, Ceylon, and the Malay Archipelago.

Synopsis of Indian Species.

25 to 30 rows of scales between the base of the anal fin and back..............	1. *L. guntea*, p. 220.
30 to 40 rows of scales between base of anal fin and back	2. *L. thermalis*, p. 221.
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237. (1.) Lepidocephalichthys guntea. (Fig. 80.)

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Lepidocephalichthys guntea, *Day, Fish. India*, p. 609, pl. clv, fig. 4 (see synon.).

Kondaturi and *Jupkari*, Ooriah.

B. iii. D. 8–9 (2/6–7). P. 8. V. 7–8. A. 7 (2/5). C. 16. L.l.ca. 115.

Length of head $6\frac{1}{2}$ to $6\frac{3}{4}$, height of body $5\frac{3}{4}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter one fifth of length of head, $1\frac{1}{2}$ diameters

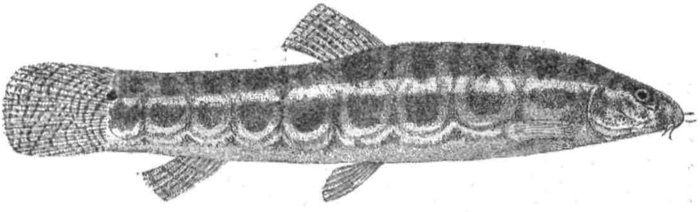

Fig. 80.—*Lepidocephalichthys guntea.*

from end of snout, and 1 diameter apart. *Barbels*—two rostral and one maxillary pair, all longer than the orbit. *Fins*—caudal

generally entire, its median rays, however, may be somewhat shortened or even lengthened. Inner pectoral ray sometimes modified into a flat spine having a branched termination. *Scales*—25 to 30 rows between the base of the anal fin and the back. *Colour*—generally dirty yellowish, with a light band extending from the centre of the snout, and ending in a black ocellus above the middle of the base of the caudal fin; below this band are a series of dark blotches festooned inferiorly, whilst the back is similarly marked. Dorsal and caudal with numerous rows of dark spots, but only about four on the caudal in Deccan examples, and often two rows on the anal fin.

The variety, *L. balgara* (Fishes of India, pl. clvi, fig. 12), (*Jubbi cowri*, Ooriah), closely resembles the above, but has its body a little more elongated, and its caudal fin is sometimes cut rather more square; in a few examples the ventral fin is slightly in advance of the dorsal, but not so in others.

Hab. Punjab, throughout India (except Mysore and south of the Kistna, and also the Malabar coast). I have specimens from Darjeeling, and several localities on the Himalayas.

238. (2.) Lepidocephalichthys thermalis.

Cobitis thermalis, *Cuv. & Val. H. N. Poiss.* xviii, p. 78.
Lepidocephalichthys thermalis, *Day, Fish. India*, p. 610, pl. clv, fig. 3 (see synon.).

Assaree, Tam.; *Jubbi cowri*, Ooriah; *Bálu*, Hind.; *Chickani* and *Mura*, Maráthi.

B. iii. D. 8 (2/6). P. 7. V. 7. A. 7 (2/5). C. 16.

Length of head $5\frac{1}{2}$ in the total length. *Eyes*—almost entirely in the anterior half of the head. *Barbels*—eight, the longest extending to below the anterior margin of the orbit. *Fins*—caudal slightly emarginate. The inner pectoral ray is modified in some adult males into a flat osseous spine which is used for diving down into the mud. *Scales*—distinct, about 30 rows between the base of the anal fin and the back. *Colour*—sandy, with irregular blotches on the lateral line, and others along the back; a black spot generally exists at the base of the upper half of the caudal fin. Dorsal fin with black spots or bars, caudal with four bands. A dark streak often extends from the eye to the end of the snout.

Hab. Southern India, the Malabar coast, the Wynaad, and Ceylon.

239. (3.) Lepidocephalichthys berdmorei.

Acanthopsis berdmorei, *Blyth, J. A. S. B.* xxix, 1860, p. 168.
Lepidocephalichthys berdmorei, *Day, Fish. India*, p. 610, pl. cliii, fig. 3 (see synon.).

Nga-tha-lay-doh, Burmese.

B. iii. D. 8 (2/6). P. 10. V. 8. A. 7–8 (2/5–6). C. 17.

Length of head 6 to $6\frac{1}{4}$ in the total length. *Eyes*—situated just before the middle of the length of head. *Barbels*—two pairs of rostral and a maxillary pair extending to below the hind edge of the orbit. *Fins*—the caudal is slightly emarginate. The pectoral does not reach quite halfway to the ventral. *Scales*—small, about 40 rows between the anal fin and the back; several rows (about 12) along the suborbital ring of bones. *Colour*—of a rich yellowish brown, with a dark line along the body composed of spots, upper surface of body covered with fine markings; a black spot at the base of the caudal fin. Dorsal and caudal fins lineated with fine spots; some also on the outer portions of pectoral, ventral, and anal.

Hab. Moulmein in Burma, where it is common.

5. Genus **ACANTHOPHTHALMUS**, v. Hasselt.

Syn. *Pangio*, Blyth.

Body elongate and strongly compressed. An erectile, bifid, suborbital spine. Six barbels, one rostral and two maxillary pairs. Dorsal fin situated in the posterior third of the body, anterior to the anal, but posterior to the ventrals.

240. (1.) **Acanthophthalmus pangia.** (Fig. 81.)

Cobitis pangia, *Ham. Buch. Fish. Ganges*, pp. 355, 394.
Acanthophthalmus pangia, *Day, Fish. India*, p. 610, pl. clv, fig. 5 (see synon.).

Pangya, Beng.; *Nga-tha-lay-doh*, Burmese.

B. iii. D. 8 (2/6). P. 10. V. 6–7. A. 7 (2/5). C. 17.

Length of head $7\frac{1}{2}$ to 8 in the total length. *Eyes*—minute. *Barbels*—six, the longest about two fifths of the length of the head. *Fins*—caudal entire. *Scales*—distinct. *Colour*—light cinnamon.

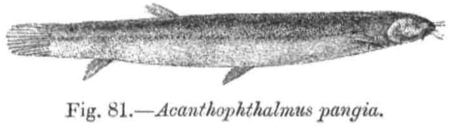

Fig. 81.—*Acanthophthalmus pangia.*

Hab. North-east Bengal, the northern portions of Pegu and Upper Burma.

6. Genus **APUA**, Blyth.

Body elongate and compressed. A small, erectile, bifid, suborbital spine. Eight barbels—one rostral pair, one maxillary pair, and two mandibular pairs. Dorsal fin in the posterior third of the body, but anterior to the anal. Ventral fins absent.

241. (1.) Apua fusca.

Apua fusca, *Blyth, J. A. S. B.* xxix, 1860, p. 169; *Day, Fish. India,* p. 611, pl. clv, fig. 6 (see synon.).

B. iii. D. 8 (2/6). P. 11. A. 8 (2/6). C. 16.

Length of head $7\frac{1}{2}$ to 8 in the total length. *Eyes*—small. *Barbels*—six, the longest one third the length of the head. *Fins*—caudal rounded. *Scales*—minute. *Colour*—brownish, with a longitudinal darker band.

Hab. Pegu in Burma; attaining at least $2\frac{1}{2}$ inches in length.

7. Genus **JERDONIA**, Day.

Syn. *Platacanthus*, sp., Day.

Body elongate and moderately compressed. Eight barbels, two of which are mandibular. A free, erectile, bifid, suborbital spine. Dorsal fin long (twenty-seven branched rays), commencing before the ventrals; the internal ray of the pectoral fin modified into a flat osseous spine; caudal slightly emarginate.

242. (1.) Jerdonia maculata. (Fig. 82.)

Platacanthus maculatus, *Day, P. Z. S.* 1867, p. 941.
Jerdonia maculata, *Day, P. Z. S.* 1870, p. 700, note; *id. Fish. India,* p. 611, pl. cliv, fig. 6.

B. iii. D. 30 (3/27). P. 5/1. V. 8. A. 9 (3/6). C. 21.

Length of head two elevenths of the total length. *Eyes*—diameter one sixth of length of head, 2 diameters from end of

Fig. 82.—*Jerdonia maculata.*

snout. *Scales*—small, but distinct. *Colour*—greyish, becoming dirty white along the abdomen. A dark lateral band extends from the eye to the tail; along its first half are three black spots, whilst the whole extent of the back is irregularly lineated. Fins yellow. Dorsal with four black bands. Caudal with three bands and a dark margin. A black mark at the base of the tail, with a smaller one above and another below it.

Hab. Madras.

8. Genus **NEMACHILICHTHYS**, Day.

Body elongate. Dorsal profile not elevated. Snout rather compressed and elongate. Eyes rather prominent. Barbels six,

two rostral and one maxillary pairs. No spine on the head Dorsal fin of moderate length, commencing somewhat in advance of the ventrals. Caudal forked.

The appearance of this form is very similar to *Acanthopsis* except that there is no spine on the head.

243. (1.) **Nemachilichthys rueppelli.** (Fig. 83.)

Cobitis rüppelli, *Sykes, Tr. Z. S.* ii, p. 366, pl. 64, fig. 1.
Nemachilichthys rüppelli, *Day, Fish. India*, p. 612, pl. clv, fig. 7 (see synon.).

B. iii. D. 13 (2/11). P. 13. V. 8. A. 7 (2/5). C. 19.

Length of head $5\frac{1}{4}$ in the total length. *Eyes*—slightly behind the middle of the length of the head. *Barbels*—two well-developed rostral pairs, also a maxillary pair. *Scales*—moderately developed.

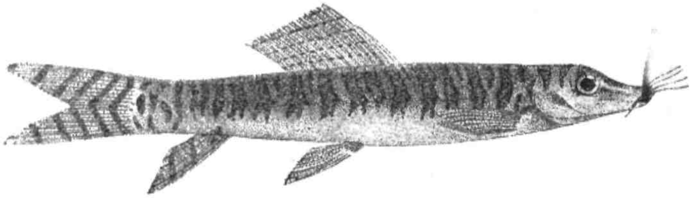

Fig. 83.—*Nemachilichthys rueppelli.*

Colour—greenish yellow except on the abdomen, which is white; short brown bars along the lateral line, and the rays of the dorsal and anal barred. Caudal with four posteriorly directed V-shaped brown bars. A black spot at the base of the upper caudal lobe.

Hab. Deccan.

9. Genus **NEMACHILUS**, van Hasselt.

Syn. *Acoura* and *Acourus*, Swains.; *Acanthocobitis*, Peters; *Oreias*, Sauvage; *Diplophysa*, Kessler.

Body elongate. Dorsal profile nearly horizontal. Barbels eight or six, when the former number is present, the extra pair belongs to the posterior nostrils; none on the mandibles. No spine on the head. Dorsal fin of moderate length, or short, situated opposite the ventrals.

Geographical Distribution. Fresh waters of Europe and Asia; inhabiting India, Ceylon, Burma, and the Malay Archipelago.

Synopsis of Indian Species.

A. Barbels 8.
  D. 9. Greenish, with small dark blotches. 1. *N. evezardi*, p. 226.
B. Barbels 6.
  D. 16–20. Body barred; caudal slightly notched.......................... 2. *N. pavonaceus*, p. 226.

D. 15–16. Body with 12 to 15 bands. Caudal emarginate	3. *N. rubidipinnis*, p. 226.
D. 11–14. Body irregularly blotched. Caudal entire or slightly emarginate ..	4. *N. botius*, p. 227.
D. 12. Caudal and dorsal fins barred. Caudal rounded	5. *N. monoceros*, p. 227.
D. 12. Caudal forked. Yellow blotches on body. Fins barred	6. *N. pulchellus*, p. 228.
D. 10–11. Caudal cut square. Vertical brown bands, with shorter intermediate ones. Dorsal and caudal barred	7. *N. sinuatus*, p. 228.
D. 10–11. Reticulated with brown. Caudal forked	8. *N. guentheri*, p. 228.
D. 10–11. Irregular spots and bars on the body and fins. Caudal forked	9. *N. semiarmatus*, p. 229.
D. 10. About 13 blotches along the side. Caudal forked	10. *N. corica*, p. 229.
D. 9–11. Eleven to 17 brown bands on the body, as wide as the ground-colour or wider. Dorsal and caudal banded or spotted. Caudal forked	11. *N. rupicola*, p. 229.
D. 9–10. Eleven or 12 vertical bands. Caudal emarginate	12. *N. montanus*, p. 230.
D. 10–12. Sixteen to 20 vertical bands, wider than the ground-colour. Caudal emarginate	13. *N. striatus*, p. 230.
D. 10. Snout compressed, eye small; numerous vertical bands, widest in last half of body. Caudal lobed	14. *N. multifasciatus*, p. 231.
D. 10. Mouth of moderate width. Nine to 12 vertical bands wider than the ground-colour. Caudal lobed	15. *N. denisonii*, p. 231.
D. 10. Snout compressed; eye of moderate size. Ten to 14 vertical bands wider than the ground-colour. Caudal lobed.	16. *N. notostigma*, p. 232.
D. 11. Ten or 11 vertical bands, with intermediate ones superiorly. Dorsal and caudal spotted. Caudal entire	17. *N. zonalternans*, p. 232.
D. 10. Sixteen to 18 interrupted and sinuous bands. Caudal lobed or emarginate	18. *N. ladacensis*, p. 232.
D. 9. Eleven to 15 dark zones encircle the body, which are not half the width of the ground-colour. Caudal forked	19. *N. zonatus*, p. 233.
D. 10. Ten brown zones encircle the body, usually wider than the ground-colour. Caudal slightly forked	20. *N. cincticauda*, p. 233.
D. 10. Seven black-edged angular bands on the body. Caudal emarginate	21. *N. triangularis*, p. 234.
D. 10–11. Ten to 12 very narrow white bands. Caudal slightly emarginate	22. *N. savona*, p. 234.
D. 10. Dark bands, wider than the interspaces. Caudal forked	23. *N. beavani*, p. 234.
D. 9–10. Eleven to 15 irregular bands. Caudal slightly emarginate	24. *N. spilopterus*, p. 235.
D. 9. Mottled with brown. Caudal entire	25. *N. marmoratus*, p. 235.

D. 9. Marbled with brownish black. Caudal emarginate .... 26. *N. stoliczkæ*, p. 235.
D. 9. Brownish. Caudal forked ...... 27. *N. blythii*, p. 236.
D. 9. Caudal rounded .... 28. *N. butanensis*, p. 236.
D. 9. Brownish. Caudal emarginate.... 29. *N. gracilis*, p. 237.
D. 8 (10?). Spotted and blotched. Caudal emarginate .... 30. *N. turio*, p. 237.
D. 8. Dark blotches. Caudal entire .... 31. *N. guttatus*, p. 237.

244. (1.) Nemachilus evezardi.

Nemacheilus evezardi, *Day, Fish. India*, p. 613, pl. cliii, fig. 11.

B. iii. D. 9 (2/7). P. 12. V. 8. A. 7 (2/5). C. 17.

Length of head $5\frac{1}{3}$ in the total length. *Eyes*—just before the middle of the length of the head and rather minute. *Barbels*—well developed, one pair nasal, reaching to opposite hind edge of the eye; two pair rostral, and one maxillary pair. *Fins*—upper edge of dorsal fin slightly convex. Caudal rounded. *Colour*—greenish, with small dark blotches having a vertical direction, a dark spot at the base of the caudal fin, which has four V-shaped bands; some spots on dorsal fin; outer half of pectoral dark.

Hab. Poona.

245. (2.) Nemachilus pavonaceus.

Cobitis pavonacea, *McClelland, As. Res.* xix, pt. 2, *Ind. Cyp.* pp. 305, 437, pl. 52, fig. 1.
Nemacheilus pavonaceus, *Day, Fish. India*, p. 613, pl. cliii, fig. 12 (see synon.).

B. iii. D. 16–20 (2–3/14–18). V. 8. A. 7 (2/5). C. 19.

Length of head $5\frac{3}{4}$ in the total length. *Eyes*—in the middle of the length of the head. In some specimens the preorbital forms a blunt spine. *Fins*—dorsal commences nearer to the snout than to the base of the caudal, which latter is slightly emarginate. *Colour*—body crossed by about twenty half-bars of a darkish grey; a dark ocellus surrounded by a light margin exists upon the upper portion of the base of the caudal fin. Dorsal and caudal barred.

Hab. Assam.

246. (3.) Nemachilus rubidipinnis.

Cobitis rubidipinnis, *Blyth, J. A. S. B.* xxix, 1860, p. 170.
Nemacheilus rubidipinnis, *Day, Fish. India*, p. 614, pl. cliii, fig. 4 (see synon.).

B. iii. D. 15–16 (2/13–14). P. 14. V. 8. A. 7 (2/5). C. 19.

Length of head $5\frac{1}{4}$ in the total length. *Eyes*—in the middle of the length of the head. *Barbels*—the two rostral pairs reach to below the front edge of the eye. The maxillary pair are of about the same length. *Fins*—dorsal commences rather nearer to the snout than to the base of the caudal fin. *Scales*—15 rows between the lateral line and base of the ventral fin. Caudal nearly entire.

Colour—reddish brown, with 12 to 16 irregular darkish bands descending from the back and ending in dark spots below the lateral line; 4 to 6 oblique bands on the dorsal fin; 6 to 8 irregular vertical bars on the caudal, which has a black ocellus on the upper half of its base.

Hab. Tenasserim.

247. (4.) Nemachilus botius.

Cobitis botia, *Ham. Buch. Fish. Ganges*, pp. 350, 394.
Nemacheilus botia, *Day, Fish. India*, p. 614, pl. clvi, fig. 5 (see synon.).

Bil-turi and *Balli-potiah*, Assam; *Soon-da-lee*, Punj.; *Teli-mura*, Maráthi.

B. iii. D. 12–14 (2/10–12). P. 11. V. 8. A. 7 (2/5). C. 17.

Length of head $4\frac{1}{2}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ to 4 in the length of head, $1\frac{1}{2}$ to $1\frac{3}{4}$ diameters from end of snout and $1\frac{1}{4}$ apart. The preorbital has in some specimens a projection, which is movable, below the orbit (*N. botius*), whilst in others it is entirely concealed by the skin (*N. bilturio*). *Barbels*—long, the maxillary pair reaching to below the posterior edge of the eye. *Fins*—dorsal commences rather nearer to the snout than to the base of the caudal fin, its upper edge nearly straight; caudal slightly notched. *Scales*—distinct. *Lateral line*—complete, 12 rows of scales between it and the base of the ventral fin. *Colour*—greyish, with from 10 to 14 short bars on the lateral line, and a number of irregular blotches above it, sometimes forming bands over the back. Dorsal fin orange and with rows of black spots; caudal with about seven irregular bars bent at an angle, and a black ocellus on the upper portion of the base of the fin.

Variety *Nemachilus aureus*, Fishes of India, p. 614, pl. clvi, fig. 4. D. 11–12 (2/9–10). Dorsal fin of much less extent than in *N. botius*. Lateral line ceases opposite the posterior end of the dorsal fin.

Hab. Sind, Punjab, and throughout India (except the Malabar coast and south of the River Kistna) and Ceylon; common in Assam. Although the variety *N. aureus* is found in Assam, it is more abundant than *N. botius* in the upper portion of the Ganges and Jumna. It is also the form in the Nerbudda, and throughout the Deccan, where the *N. botius* is likewise to be obtained.

248. (5.) Nemachilus monoceros.

Cobitis monocera, *McClell. Ind. Cyp.* pp. 305, 438, pl. 52, fig. 2.
Nemacheilus monoceros, *Day, Fish. India*, p. 615 (see synon.).

B. iii. D. 12. P. 12. V. 8. A. 6. C. 18.

Length of head one fourth of the total without the caudal fin. *Eyes*—situated behind the middle of the length of the head. *Fins*—caudal rounded. *Colour*—body greenish yellow with a silvery lustre; opercles tinged with green. Caudal and dorsal streaked with numerous small brown bars.

Hab. Assam.

249. (6.) Nemachilus pulchellus.

Nemacheilus pulchellus, *Day, Journ. L. S.* xi, p. 528; ***Fish. India,*** p. 615, pl. clvi, fig. 7.

B. iii. D. 12 (2/10). P. 15. V. 9. A. 7 (2/5). C. 21.

Length of head 5½ in the total length. *Eyes*—rather small, in the middle of the length of the head. *Barbels*—six, the rostral thicker than the maxillary pair. *Fins*—dorsal equals the height of the body below it. *Colour*—this beautiful little loach is of greyish colour, becoming whitish below; there are along the side between the head and middle of the dorsal fin two rows of large, vertical, canary-yellow spots, having deep black margins; posterior to the dorsal they become wide vertical bands two thirds as wide as the ground-colour. Caudal with three or four oblique black bands, and a deep black spot at the centre of its base. Dorsal yellowish orange at its upper anterior portion, two wide black bars along its centre, and one across the anal.

Hab. Bhaváni River; growing to 2½ inches in length.

250. (7.) Nemachilus sinuatus.

Nemacheilus sinuatus, *Day, P. Z. S.* 1870, p. 371; *Fish. India,* p. 615, pl. clvi, fig. 3.

B. iii. D. 10–11 (2/8–9). P. 12. V. 8. A. 7 (2/5). C. 18.

Length of head 5 in the total length. *Eyes*—situated slightly before the middle of the length of the head. *Barbels*—long and thin. *Fins*—dorsal arising slightly in advance of the ventrals; caudal cut square. *Scales*—distinct; 10 rows between the lateral line and the base of the ventral fin. *Lateral line*—ceases opposite the middle or end of the dorsal fin. *Colour*—olive, with irregular vertical brown bands, having shorter intermediate ones. A black ocellus at the upper portion of the base of the caudal fin. Dorsal yellow, with three or four rows of black spots. Caudal orange, with four angulate bars, the angle in each of which is directed backwards.

Hab. Wynaad.

251. (8.) Nemachilus guentheri.

Nemacheilus guentheri, *Day, P. Z. S.* 1867, p. 285; ***Fish. India,*** p. 615, pl. clvi, fig. 10.

B. iii. D. 10–11 (2/7–8). P. 11. V. 7. A. 7 (2/5). C. 19.

Length of head 5½ in the total length. *Eyes*—situated just before the middle of the length of the head. *Fins*—the dorsal fin commences about midway between the end of the snout and the base of the caudal, which is lobed. *Scales*—small, but distinct. *Lateral line*—incomplete. *Colour*—pinkish, coarsely reticulated with olive-brown markings, leaving three rows of large spots along the side; a black band at the base of the caudal fin, which has two indistinct dark bands across both lobes, the extremities of which are

stained. Two rows of fine black dots along the dorsal fin, and one across the anal.

Hab. Rivers along the lower slopes and base of the Nilgiri hills.

252. (9.) **Nemachilus semiarmatus.**

Nemacheilus semiarmatus, *Day, P. Z. S.* 1867, p. 286; *Fish. India*, p. 616, pl. clvi, fig. 11 (see synon.).

B. iii. D. 10–11 (2–3/8). P. 12. V. 7. A. 7 (2/5). C. 18.

Length of head $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the length of head, $1\frac{1}{3}$ diameters from end of snout, 1 diameter apart. The greatest width of the head equals its length excluding the snout. *Fins*—origin of dorsal midway between the snout and the base of the caudal. Caudal lobed in its last half. *Lateral line*—complete. *Colour*—light brown, with numerous irregularly shaped spots and bars proceeding from the back towards the lateral line; head brownish, with a dark line from the snout through the orbit. Dorsal fin with about three rows of dark spots; caudal irregularly barred; a dark line runs along the centre of the back.

Hab. Bhaváni and Sigur rivers along the base of the Nilgiri hills; also imported into tanks on those mountains.

253. (10.) **Nemachilus corica.**

Cobitis corica, *Ham. Buch. Fish. Ganges*, pp. 359, 395.
Nemacheilus corica, *Day, Fish. India*, p. 616, pl. clvi, fig. 1 (see synon.).

Khorika, Beng.

B. iii. D. 10 (2/8). P. 13. V. 8. A. 7 (2/5). C. 17.

Length of head $5\frac{1}{2}$ in the total length. *Eyes*—in the middle of the length of the head. *Barbels*—thin, the external rostral pair longer than the orbit. *Fins*—the dorsal commences anterior to the ventral and nearer to the snout than to the base of the caudal, which last is lobed in its posterior half. *Scales*—visible in the posterior half of the body. *Colour*—bluish, with about thirteen black blotches along the middle of the side, and smaller ones above and descending to between them; usually a silvery band along the middle of the side.

Hab. N.E. Bengal, Punjab, and Assam.

254. (11.) **Nemachilus rupicola.**

Schistura rupecula, *McCelland, J. A. S. B.* vii, p. 948, pl. 55, fig. 3.
Nemacheilus rupicola, *Day, Fish. India*, p. 616, pl. cliii, fig. 9 (see synon.).

Saant-al, Punj.

B. iii. D. 9–11 (2–3/7–8). P. 10. V. 8. A. 7 (2/5). C. 18.

Length of head $5\frac{1}{2}$ in the total length. *Eyes*—in the middle of

the length of the head. *Fins*—dorsal commences midway between the nostrils and the base of the caudal fin. Caudal emarginate. *Scales*—absent, or minute in the posterior half of the body. *Lateral line*—complete. *Colour*—yellowish, with 12 to 17 vertical brown bands, much narrower than the intermediate ground-colour, and decreasing in width below the lateral line, they are sometimes incomplete; a wide dark band across the base of the caudal, which fin as well as the dorsal has several rows of spots forming bands; a dark mark at the base of the anterior dorsal rays, sometimes another at the base of the middle ones.

Hab. Himalayas and ? Tibet at 16,000 feet above the sea.

255. (12.) Nemachilus montanus.

Schistura montana, *McCelland, As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 307, 440, t. 57, fig. 1.

Nemacheilus montanus, *Day, Fish. India*, p. 616, pl. cliii, fig. 6 (see synon.).

Saant-al, Punj.

B. iii. D. 9–10 (2/7–8). P. 10. V. 7. A. 7 (2/5). C. 19.

Length of head $5\frac{1}{2}$ to $5\frac{2}{3}$ in the total length. *Eyes*—small, situated before the middle of the length of the head. The preorbital is in the form of an obtuse movable projection, which is sometimes covered by skin. *Barbels*—short, but stout. *Fins*—dorsal commences midway between the posterior margin of the orbit and the base of the caudal fin. Caudal lobed. *Scales*—minute. *Colour*—eleven or twelve vertical brown bands, each from nearly as wide to three times as broad as the buff interspaces. Caudal with a black band at its base and a bar across each lobe. Dorsal with a black base and a black mark at the base of its two first rays, and a dark bar across its centre.

Hab. Himalayas; attaining at least $4\frac{1}{2}$ inches in length.

256. (13.) Nemachilus striatus.

Nemacheilus striatus, *Day, P. Z. S.* 1867, p. 347; *Fish. India*, p. 617, pl. cliii, fig. 8 (see synon.).

Cul-irum and *Kul-nakura*, Tamil.

B. iii. D. 11–12 (2/9–10). P. 11. V. 8. A. 7 (2/5). C. 17.

Length of head $5\frac{1}{2}$ to 7 in the total length. *Eyes*—in the middle of the length of the head. *Barbels*—well developed. *Fins*—dorsal arises slightly in advance of the ventrals; caudal slightly lobed. *Scales*—15 rows between the lateral line and the base of the ventral fin. *Lateral line*—well marked. *Colour*—light reddish brown, with narrow vertical bands darker than the ground-colour, and most distinct in the posterior portion of the body, where there are from 12 to 16 behind the commencement of the dorsal fin, and several more between that and the head, which last is marked all over with black

lines and spots. A black band at the base of the caudal fin. Dorsal brilliant orange, with a black edge having a light external margin and a dark base; or else one or two rows of spots. Anal orange, with some dull black spots; caudal likewise yellow and spotted in two rows.

Hab. Wynaad at 3000 feet elevation; it attains $2\frac{1}{2}$ inches in length.

257. (14.) Nemachilus multifasciatus.

Nemacheilus multifasciatus, *Day, Fish. India*, p. 617, pl. cliii, fig. 7 (see synon.).

B. iii. D. 10 (2/8). P. 11. V. 9. A. 7 (2/5). C. 18.

Length of head $5\frac{1}{2}$ in the total length. *Eyes*—situated partly before the middle of the length of the head. *Barbels*—the maxillary pair rather longer than the eye, the two rostral pairs slightly shorter. *Fins*—caudal lobed in its last fourth. Pectoral reaches halfway to the ventral. *Scales*—small. *Lateral line*—complete. *Colour*—vertical bands, as wide as the ground-colour, pass from the back to the lower surface of the abdomen; those between the head and the dorsal fin are numerous, whilst there are about five posterior to the latter; in some examples the anterior bands coalesce. A dark band at the base of the caudal and dark marks on the head radiating from the eye. Fins yellow, the dorsal with four bands of spots and an equal number or more on the caudal. Ventral and anal with two bands each.

Hab. Darjeeling and Assam.

258. (15.) Nemachilus denisonii.

Nemacheilus denisonii, *Day, P. Z. S.* 1867, p. 287; *Fish. India*, p. 617, pl. cliii, fig. 5 (see synon.).

B. iii. D. 10 (2/8). P. 11. V. 7. A. 7 (2/5). C. 17.

Length of head 5 to $5\frac{1}{2}$ in the total length. *Eyes*—situated in the anterior half of the head. *Barbels*—the maxillary extend to the opercle, the rostral pairs are shorter. *Fins*—dorsal commences midway between end of snout and base of caudal, which last is lobed. Pectoral extends rather above one half the distance to the ventrals. *Scales*—minute. *Lateral line*—complete. *Colour*—reddish brown, having from nine to twelve dark vertical zones, those anterior to the dorsal fin sometimes coalescing rather irregularly across the back. Dorsal fin with three rows of fine black spots and a black base. Caudal irregularly spotted in bands. Some dull spots on the ventral and anal fins. Most of the head marbled with black dots.

Hab. Nilgiri and Coorg hills, and rivers at their bases; Mysore and the Deccan.

259. (16.) Nemachilus notostigma.

Nemachilus notostigma, *Bleeker, Verh. Holl. Maatsch. Haarl.* 1864, *Cobit. et Cyp. Ceylon*, p. 5, t. i, fig. 2; *Day, Fish. India*, p. 618 (see synon.).

B. iii. D. 10 (2/8). V. 7. P. 13. A. 7–8 (2–3/5). C. 19.

Length of head $5\frac{1}{3}$ to 6 in the total length. *Eyes*—diameter 5 in length of head, 2 diameters from end of snout, $1\frac{1}{4}$ apart. *Barbels*—all rather longer than the eye. *Fins*—dorsal arises a little in advance of the ventrals; it is not quite so high as the body below it. Pectoral nearly as long as the head. Caudal lobed in its posterior third. *Scales*—indistinct. *Colour*—ten to fourteen vertical bands on the body, broader than the interspaces. A dark mark at the base of the caudal, which is banded. A black spot at the base of the anterior dorsal rays, and a bar across the lower portion of the fin in its last half, a single band across its centre.

Hab. Ceylon.

260. (17.) Nemachilus zonalternans.

Cobitis zonalternans, *Blyth, J. A. S. B.* xxix, 1860, p. 172.
Nemacheilus zonalternans, *Day, Fish. India*, p. 618 (see synon.).

B. iii. D. 11 (2/9). P. 11. V. 9. A. 7 (2/5). C. 19.

Eyes—of moderate size, rather above one diameter from end of snout. *Fins*—dorsal arises anterior to the insertion of the ventral; caudal entire. *Scales*—distinct. *Colour*—ten or eleven bars descend down the lower two thirds of the body to the abdomen, with intermediate half-bands superiorly between them. Dorsal and caudal fins spotted in bands.

Hab. Tenasserim Provinces.

261. (18.) Nemachilus ladacensis.

Nemacheilus ladacensis, *Günther, Catal.* vii, p. 356; *Day, Fish. India*, p. 618 (see synon.).

B. iii. D. 10 (2/8). V. 9. A. 8 (2/6). C. 19.

Length of head 5 in the total length. *Eyes*—diameter 5 to $5\frac{1}{2}$ in length of head, $2\frac{1}{2}$ diameters from end of snout and 2 apart. *Barbels*—of moderate length. *Fins*—dorsal commences halfway between the front edge of the eye and the root of the caudal, which latter is emarginate. Pectoral extends rather above halfway to the base of the ventral. *Scales*—absent. *Colour*—of a light fawn, with 16 or 18 interrupted darker and sinuous bands passing from the back down the sides; a silvery lateral band. Dorsal and caudal finely spotted in lines; a darkish band on pectoral, ventral, and anal fins.

Hab. Tibet, whence two specimens were procured.

262. (19.) Nemachilus zonatus.

Schistura zonata, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 308, 441, pl. 53, fig. 1.
Nemacheilus zonatus, *Day, Fish. India*, p. 618, pl. clvi, fig. 2 (see synon.).

Mugah, Beng.

B. iii. D. 9 (2/7). P. 11. V. 8. A. 7–8 (2/5–6). C. 17. L. 1. 110.

Length of head 5 in the total length. *Eyes*—diameter one fifth of length of head, 2 diameters from end of snout, 1½ diameters apart. *Barbels*—all about as long as the eye. *Fins*—dorsal arises midway between snout and base of caudal, its upper margin is straight; pectorals extend a little above halfway to the base of ventrals; caudal forked. *Scales*—small, but distinct. *Lateral line*—commences by two roots, which soon coalesce; it is continued to the base of the caudal. *Colour*—yellowish, with a green tinge; about fifteen brown bands, one third as wide as the ground-colour, pass across the back and descend on either side below the lateral line; a few near the head, and some in the posterior third of the body are interrupted. Upper surface of head marbled with black. Fins immaculate, but the first two anal rays are black anteriorly, and there are also slight black marks near the end of the ventrals and on the outer side of the pectorals. Rostral barbels orange. The *young* have a wide silvery band along the side, ending in a dark mark at the base of the caudal fin.

Hab. Throughout the Jumna and Ganges rivers and their affluents, Beerbhoom, Assam, and Orissa; attaining at least two inches in length.

263. (20.) Nemachilus cincticauda.

Cobitis cincticauda, *Blyth, J. A. S. B.* xxix, 1860, p. 172.
Nemacheilus cincticauda, *Day, Fish. India*, p. 619, pl. clvi, fig. 6 (see synon.).

B. iii. D. 10 (2/8). P. 11. V. 8. A. 7 (2/5). C. 19.

Length of head 5¼ in the total length. *Eyes*—situated in the middle of the length of the head. *Barbels*—well developed. *Fins*—dorsal arises nearer to the snout than to the base of the caudal, which last is slightly forked with pointed lobes. *Scales*—minute. *Colour*—yellowish, with ten regular brown zones encircling the body, and sometimes but not always broader than the ground-colour, or the bands may be broken up and irregular; a dark bar at the base of the caudal and a dark band between the eye and the snout; occasionally a dark mark on the opercle. Dorsal with some black spots.

Hab. Burma.

264. (21.) Nemachilus triangularis.

Nemacheilus triangularis, *Day, P. Z. S.* 1865, p. 295, *and Fish. India*, p. 619, pl. cliii, fig. 10.

B. iii. D. 10 (2/8). P. 11. V. 9. A. 7 (2/5). C. 19.

Length of head $5\frac{1}{3}$ in the total length. *Eyes*—diameter $4\frac{3}{4}$ in length of head, 2 diameters from end of snout and 1 apart. *Barbels*—of moderate length. *Fins*—dorsal commences midway between the end of the snout and the base of the caudal, which latter is emarginate. *Scales*—small but distinct in the last portion of the body. *Lateral line*—complete. *Colour*—yellowish, with about seven black-edged bands on the body and head, each bent angularly at the lateral line. Dorsal with three irregular rows of black spots. Pectoral, ventral, and anal unspotted, but stained at their margins. Several oblique bars across each lobe of the caudal, which has a black mark at its base.

Hab. Travancore hills.

265. (22.) Nemachilus savona.

Cobitis savona, *Ham. Buch. Fish. Ganges*, pp. 357, 394.
Nemacheilus savona, *Day, Fish. India*, p. 619, pl. clv, fig. 8.

Savon-khorka, Beng.; *Mura*, Maráthi.

B. iii. D. 10–11 (2–3/8). P. 10. V. 7. A. 7 (2/5). C. 18.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—rather large, rather behind the middle of the length of the head. *Barbels*—long. *Fins*—dorsal arises before the origin of the ventrals. Caudal very slightly emarginate, its lobes being rounded. *Lateral line*—incomplete. *Scales*—small. *Colour*—purplish, becoming lighter on the abdomen, with from ten to twelve very narrow vertical white bands, not above one eighth to one sixth as wide as the ground-colour; a black band at the root of the caudal fin; a black blotch at the base of the first few dorsal rays, on to which the white body-bands are continued, and four or five rows of dark spots on the fin. Caudal with narrow bands of dark spots; two bands also on the ventral and anal fins.

Hab. Bengal and N.W. Provinces.

266. (23.) Nemachilus beavani.

Nemachilus beavani, *Günther, Catal.* vii, p. 350; *Day, Fish. India*, p. 620, pl. clvi, fig. 8.

B. iii. D. 10 (2/8). P. 11. V. 7. A. 7 (2/5). C. 19.

Length of head 5 in the total length. *Eyes*—small, just before the middle of the length of the head. *Barbels*—six. *Fins*—dorsal arises slightly nearer end of snout than base of caudal. Caudal lobed. *Scales*—minute. *Colour*—body with nine dark cross bands

broader than the lighter interspaces, a black streak across the root of the caudal. Dorsal and caudal rays with blackish dots. The bands appear to be absent in some specimens.

Hab. Bhaváni river in Madras and Mysore, also Orissa.

267. (24.) **Nemachilus spilopterus.**

Cobitis spiloptera, *Cuv. & Val. H. N. Poiss.* xviii, p. 27, pl. 522.
Nemacheilus spilopterus, *Day, Fish. India*, p. 620, pl. clvi, fig. 9 (see synon.).

B. iii. D. 9–10 (2/7–8). P. 15. V. 7. A. 7 (2/5). C. 19.

Length of head $5\frac{3}{4}$ to 6 in the total length. *Eyes*—near the summit of the head and in or rather before the middle of its length. *Barbels*—short. *Fins*—dorsal commences midway between end of snout and root of caudal. Caudal slightly emarginate. *Scales*—absent. *Colour*—greenish yellow, with from eleven to fifteen irregular bands crossing the back, and a black band across the root of the caudal fin. A black blotch at the base of the first three dorsal rays, two bands along the fin, another along its base, and three on caudal.

Hab. Himalayas, Assam, and Cochin China.

268. (25.) **Nemachilus marmoratus.**

Cobitis marmorata, *Heckel, Fisch. Caschmir*, p. 76, t. 12, figs. 1, 2.
Nemacheilus marmoratus, *Day, Fish. India*, p. 620, pl. clv, fig. 9 (see synon.).

B. iii. D. 9 (2/7). P. 11. V. 7. A. 7 (2/5). C. 17.

Length of head $4\frac{3}{4}$ to 5 in the total length. *Eyes*—situated in the middle of the length of the head. *Fins*—dorsal commencing midway between the end of the snout and the root of the caudal, which latter is somewhat convex or cut square at its extremity. *Scales*—absent. *Colour*—marbled or irregularly blotched and mottled with brown. Fins more or less spotted. In some specimens a dark band exists along the body and some bars over the back of the tail.

Hab. Kashmir Lake.

269. (26.) **Nemachilus stoliczkæ.** (Fig. 84.)

Cobitis stoliczkai, *Steindachner, Verh. z.-b. Ges. Wien*, 1866, p. 793.
Nemacheilus stoliczkæ, *Day, Fish. India*, p. 620, pl. clv, fig. 10 (see synon.).

B. iii. D. 9 (2/7). P. 13. V. 8. A. 7 (2/5). C. 15.

Length of head 6 in the total length. *Eyes*—diameter 8 in length of the head, 3 diameters from end of snout and 2 apart.

Barbels—the maxillary are the longest, and reach to below the hinde edge of the eye. *Fins*—origin of dorsal nearer root of cauda than end of snout. Caudal slightly emarginate. *Scales*—absent

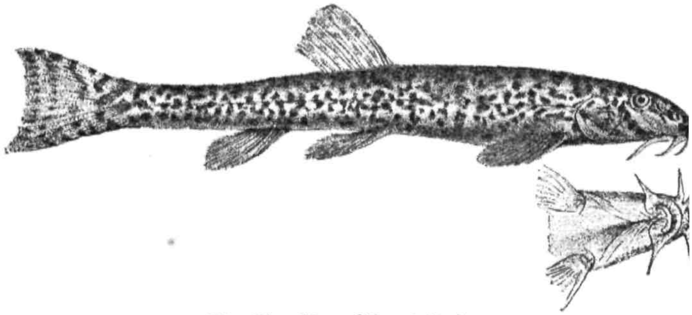

Fig. 84.—*Nemachilus stoliczkæ.*

Colour—greyish along the back, becoming lighter beneath, marbled all over with dark green or black spots or bands. Dorsal, caudal and sometimes outer pectoral rays barred.

Hab. Leh or Ladak and waters going directly into the Indus near its source, and Tibet; also Yarkand where the streams go into the Yarkand river.

270. (27.) Nemachilus blythii.

Nemacheilus blythii, *Day, P. Z. S.* 1869, p. 552, *and Fish. India* p. 621.

B. iii. D. 9 (2/7). V. 9. A. 7 (2/5). C. 19.

Length of head 5, of caudal 5, height of body $6\frac{1}{2}$ in the total length. *Eyes*—diameter two ninths of length of head, 1 diameter from end of snout, $1\frac{1}{4}$ apart. *Barbels*—longer than the orbit. *Fins*—dorsal commences midway between snout and base of caudal fin which latter has sharp lobes. *Scales*—minute. *Colour*—brownish becoming lighter on the abdomen; a dark band at the base of the caudal.

Hab. Doubtful. Two specimens, 3 inches long, exist in the Calcutta Museum.

271. (28.) Nemachilus butanensis.

Cobitis boutanensis, *McClell. Calc. Jour. N. H.* ii, p. 586.
Nemacheilus butanensis, *Day, Fish. India,* p. 621 (see synon.).

B. iii. D. 9. V. 7. A. 7.

Length of head $5\frac{1}{2}$, of caudal $5\frac{1}{2}$ in the total length. *Eyes*—small, in the middle of the length of the head. *Fins*—dorsal commences nearer to end of snout than to root of caudal, which latter is rounded. *Scales*—distinct. *Colour*—doubtful.

Hab. Bhutan, where it attains 5 inches in length. McClelland's type in the British Museum is in a bad state.

272. (29.) Nemachilus gracilis.

Nemacheilus gracilis, *Day, P. Z. S.* 1876, p. 798; *Yark. Miss. Fish.* pl. iv, fig. 5, *and Fish. India*, p. 621 (see synon.).

B. iii. D. 9 (2/7). P. 13. V. 8. A. 8 (2/6). C. 17.

Length of head $5\frac{1}{2}$, of caudal $6\frac{1}{3}$ in the total length. *Eyes*—diameter 11 in length of head, 4 diameters from end of snout, and $2\frac{1}{2}$ apart. *Barbels*—the maxillary about twice as long as the eye, the outer rostral pair reach the hind nostril, the inner are shorter. *Fins*—dorsal commences midway between eye and base of caudal fin. Caudal slightly emarginate. *Scales*—absent. *Colour*—brownish along the back, becoming yellowish beneath; dorsal and caudal with dull spots.

Hab. Basgo, on the head-waters of the Indus.

273. (30.) Nemachilus turio.

Cobitis turio, *Ham. Buch. Fish. Ganges*, pp. 358, 395.
Nemacheilus turio, *Day, Fish. India*, p. 621 (see synon.).

Turi, Assam.

B. iii. D. 8 (10?). P. 12. V. 8. A. 7. C. 19.

Length of head about $\frac{1}{5}$ of the total length. *Eyes*—of moderate size. Back elevated. *Fins*—dorsal commences midway between the end of the snout and the base of the caudal fin; pectoral nearly reaches the ventral. Caudal emarginate. *Colour*—body irregularly spotted and blotched.

Hab. Assam, said to have been taken at Goalpara.

274. (31.) Nemachilus guttatus.

Cobitis guttata, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 305, 438, pl. 52, figs. 5, 6.
Nemacheilus guttatus, *Day, Fish. India*, p. 622 (see synon.).

B. iii. D. 8.

This species is said to have only four barbels. *Colour*—light green with dark blotches.

Hab. Jorhat in Upper Assam.

B. Subfamily CYPRININÆ.

Air-bladder when present (it is absent in *Homaloptera*) not enclosed in bone.

In the subfamily *Cyprininæ*, as existing in Asia, considerable difficulty arises in dividing the genera into groups.

In forming such, a very distinctive characteristic may be found by observing whether the scaled edge or margin of the abdomen is rounded or cutting, for in the majority of the Indian *Cyprininæ* the abdominal edge is rounded or smooth, even when somewhat compressed; whilst in a few genera the abdominal edge posterior to the ventral fin is compressed, cutting, and may even be carinated as in the *Clupeidæ*: this trenchant edge is in some continued in front of the ventral fins along the thorax.

The mouth is variously formed; it may be transverse and inferior, with or without a sucker; the latter, if present, may occur either on the lower lip or on both; it may be narrow, of medium size, or wide: anterior, and either antero-lateral or oblique. The lower jaw again may be prominent, sharp or rounded, shorter than the upper, or sometimes provided with a knob at the symphysis; a movable articulation may exist there, or there may be lateral prominences on the mandibles.

The lips may be exceedingly, moderately, or but slightly developed, sometimes absent from one of the jaws, or closely investing both, or reflected from off one, or either. There may be an uninterrupted labial fold across the mandible, or portions of the lip may be much developed, fringed, or crenulated. In some genera a horny or cartilaginous covering to one or both lips is invariably or generally present, especially in forms from the hills.

The existence of a transverse groove across the snout can scarcely be distinctive of a species, much less of a genus. Thus in *Discognathus lamta* we find examples with rounded and smooth snouts, and all intermediate forms to those with very deep transverse grooves. The same may be seen in *Labeo nukta* and several fishes of that genus, and even in some species of *Barbus*, as *B. dorsalis*. The nearer the hills the more is the groove developed.

The number of barbels, though not in itself character enough for defining a genus, is frequently sufficient to distinguish subgenera: good examples of this may be seen in the genus *Barbus*, or *Barilius*. On the other hand, in some species these appendage smay be abnormally absent, as in *Danio*; consequently subdivisions of the genus founded solely on this character would lead to erroneous results.

Groups founded on the position of the fins have for convenience' sake been adopted in the following synopsis.

The last undivided dorsal ray is variously formed, being articulated or osseous, and in the latter case may be smooth or denticulated; but all these varieties are present in a single genus, as *Barbus*. The anal fin sometimes shows peculiarities, as in the *Barbus apogon*, C. & V., where the undivided rays are spiny.

The size of scales cannot by itself be depended upon for distinguishing genera, because large, moderate, and small-sized scales are all occasionally found represented in a single genus. But certain modifications may exist, as in the mountain barbels, *Schizothorax* and its allies, where a row of tile-like scales encloses the excretory outlets and the base of the anal fin; or portions of the body may be naturally left scaleless.

The pharyngeal teeth are in from one to three series, but these numbers alone do not always suffice for the definition even of genera: thus in *Chela* some species have teeth in two and others in three rows. Even the form of the teeth is not invariably similar in all the species of the same genus: thus in the *Rohtee microlepis*, Blyth, the teeth have serrations on their edges, and the two largest of the anterior row are molariform, whereas crooked and pointed teeth are the rule in the genus. Likewise the teeth are deciduous, being constantly shed and replaced; they may become blunted with age, although they had at first been sharp and pointed.

I have not retained the subfamily *Homalopterinæ*, or carps destitute of an air-bladder, because *Psilorhynchus* links it very naturally with *Discognathus*. The principal distinctive characters consist of the single row of pharyngeal teeth and the absence of the air-bladder. In many families these are deemed insufficient even to characterize genera. *Homaloptera* leads very naturally from some of the mountain siluroids to the true carps on the one hand, and to the loaches on the other.

Bleeker observed that the subfamily of *Homalopterinæ* is well distinguished from other cyprinoids by the central position of the mouth on the lower surface of the head, and the character of the pectoral ray.

Synopsis of Indian Genera.

A. Abdomen rounded, not cutting.

a. Dorsal fin commencing nearly opposite the ventrals. Anal short (5 to 7 branched rays).

Anterior portion of body depressed; snout spatulate; mouth on lower surface of head; 6 barbels. Pharyngeal teeth in one row. Outer pectoral rays unbranched or simply bifurcated. Scales small .... 1. HOMALOPTERA.

Anterior portion of body somewhat depressed; snout rather spatulate. Mouth inferior; no barbels. Outer pectoral rays unbranched. Scales of moderate size .... 2. PSILORHYNCHUS.

Mouth inferior, with a suctorial disk on the chin; 4 barbels. Pharyngeal teeth in 3 rows. Scales of moderate size. Pectoral fins subhorizontal .... 3. DISCOGNATHUS.

Mouth inferior, with the mandibles loosely joined together; a suctorial disk on the chin; 4 barbels. Pharyngeal teeth in 3 rows. Scales small, with the vent and base of anal fin enclosed by a tile-like row. Last undivided dorsal ray osseous, sometimes serrated .... 4. OREINUS.

Mouth inferior; mandibles with a sharp horny covering. No barbels. Pharyngeal teeth in 2 rows. A serrated dorsal ray. Scales present in scapular region, a tile-like row enclosing vent and base of anal fin .... 5. SCHIZOPYGOPSIS.

Mouth antero-inferior; 4 barbels. Pharyngeal teeth in 3 rows. A serrated dorsal ray. Scales small. Vent and base of anal fin enclosed in a tile-like row .... 6. SCHIZOTHORAX.

Mouth anterior or inferior; 2 barbels. Pharyngeal teeth in 2 rows. Dorsal with or without a feeble osseous ray, which is sometimes serrated. Scales small; vent and base of anal fin enclosed in a tile-like row .... 7. PTYCHOBARBUS.

Mouth inferior; lower jaw with a horny covering; 2 barbels. Pharyngeal teeth in 2 rows. Dorsal fin without any osseous ray. Scales small, not imbricated; a sheath to vent and base of anal fin .... 8. DIPTYCHUS.

Mouth anterior or inferior; lips thick, those of the two jaws continuous at the angle, and one or both with an inner fold; sometimes a lateral lobe to the snout; barbels 4, 2, or none. Pharyngeal teeth in 3 rows. Dorsal fin rather or very elongated and without any osseous ray. Scales large, of moderate size, or small .... 9. LABEO.

Differs from *Labeo* in its lips being reflected from off the mandible, leaving it uncovered as a sharp, hard, transverse prominence.................. 10. OSTEOCHILUS.

Snout somewhat depressed; mouth more or less inferior; upper lip fringed; lower jaw sharp, covered by a thin lip, and with a tubercle above the symphysis; barbels 4 or 2. Pharyngeal teeth in 3 rows. Dorsal fin elongated and without any osseous ray. Scales large, of moderate size, or small .... 11. DANGILA

Mouth transverse; snout somewhat depressed; lips thin, those of the two jaws not continuous, a small tubercle above the symphysis of the lower jaw. Barbels 4, 2, or none. Pharyngeal teeth

in 3 rows. Dorsal fin short or of moderate length, without any osseous ray. Scales large, of moderate size, or small. 12. CIRRHINA.

Snout thick; mouth inferior, with a knob at the symphysis; no barbels. Pharyngeal teeth in 3 rows. Dorsal fin long, with a strong osseous ray that is serrated or entire. Scales large .... 13. SEMIPLOTUS.

Snout rounded; mouth transverse, inferior; a horny layer inside lower jaw which is not covered by lip; 4, 2, or no barbels. Pharyngeal teeth in 3 rows. Dorsal fin of moderate extent, with its last undivided ray articulated, or else osseous and serrated, or entire. Scales of varying size .... 14. SCAPHIODON.

Head broad; snout with thin integuments; lower lip with a continuous transverse fold; lower jaw with a movable articulation at the symphysis; gill-rakers long; no barbels. Pharyngeal teeth in 3 rows. Dorsal rather long, without any osseous ray. Scales of moderate size .... 15. CATLA.

Upper lip absent; mouth antero-lateral; no barbels. Pharyngeal teeth molariform, compressed, and in 3 rows. Dorsal fin without any osseous ray and inserted opposite the ventral. Scales small. Lateral line complete ...... 16. THYNNICHTHYS.

Differs from *Thynnichthys* in having the crowns of its pharyngeal teeth flat or concave; the dorsal fin extending to nearly or quite above the anal; and the lateral line incomplete .... 17. AMBLYPHARYNGODON.

Mouth inferior; jaws closely invested by lips; no barbels. Dorsal fin short, its last undivided ray osseous and serrated; a forwardly directed spine at the base of the fin. Scales of moderate size. Lateral line complete .... 18. MATSYA.

Mouth anterior or inferior; jaws closely invested by lips, which may or may not have leathery lobes. Pharyngeal teeth in 3 rows. Dorsal fin short. Scales of large, moderate, or small size. Lateral line complete or incomplete .. 19. BARBUS.

b. Dorsal fin commencing very distinctly posterior to the ventrals, but not extending to above the anal, which last is short or of moderate length (5 to 11 branched rays).

Mouth narrow, directed obliquely upwards; 4 barbels, the maxillary pair very long. Pharyngeal teeth in 1 row. Dorsal fin without osseous ray. Scales

Mouth oblique, lower jaw with 1 central and on either side a lateral prominence fitting into corresponding emarginations in the upper jaw; a pair of rostral barbels or none. Pharyngeal teeth in 3 rows. Dorsal fin without any osseous ray. Scales large or of moderate size. 21. RASBORA.

Mouth small, inferior; lower jaw with a sharp crescentic edge but no lip; no barbels. Pharyngeal teeth in 2 or 3 rows. Dorsal fin without osseous ray. Scales of moderate size .... 22. ASPIDOPARIA.

c. Dorsal fin commencing above the interspace between the ventral and the anal, generally extending to over the latter, which is of moderate length or elongated (7 to 33 branched rays).

Mouth anterior; lips thin. Pharyngeal teeth in 3 rows. Dorsal fin with an osseous serrated ray; anal elongated. Scales small .... 23. ROHTEE.

Mouth anterior or oblique, with a deep cleft; jaws compressed. Pharyngeal teeth in 2 or 3 rows. Dorsal fin without osseous ray. Scales of moderate or of small size. Lateral line concave .. 24. BARILIUS.

Mouth directed obliquely upwards; cleft shallow; mandibles rather broad. Pharyngeal teeth in 3 rows. Dorsal fin without osseous ray and extending to above a long anal. Scales of moderate size. Lateral line concave.. 25. DANIO.

B. A portion or the whole of the abdominal edge cutting.

Mouth directed obliquely upwards; no barbels. Pharyngeal teeth in 3 rows. Dorsal fin without osseous ray, inserted over the anterior anal rays. Scales of moderate size. Lateral line concave.. 26. PERILAMPUS.

Mouth directed upwards with a knob above the symphysis of the lower jaw; no barbels. Pharyngeal teeth in 2 or 3 rows. Dorsal fin without osseous ray, a portion or the whole situated above the anal; pectorals long. Scales of moderate or small size. Lateral line concave .... 27. CHELA.

1. Genus **HOMALOPTERA**, v. Hasselt.

Syn. *Balitora*, Gray; *Platycara*, McClelland; *Octonema*, Martens.

Head and anterior part of body depressed; snout more or less spatulate. Mouth small, inferior, with two pairs of rostral barbels, and one or two at either angle of the mouth. Pharyngeal teeth

small, from 5 to 16, in one row. Pectoral and ventra fins with many rays, the outer of which are simple. Dorsal short, situated opposite to the ventrals; anal likewise short.

Geographical Distribution. Through some of the hilly districts of the Himalayas to the Wynaad and Bhaváni river in the Madras Presidency; also found in the fresh waters of Java and Sumatra.

Synopsis of Indian Species.

D. 3/8, A. 2/5, L. l. 70. Lower caudal lobe the longer. Brown, blotched with a darker tinge	1. *H. brucei*, p. 243.
D. 10, A. 2/5, L. l. 78	2. *H. maculata*, p. 243.
D. 9, A. 6. Horizontal bands	3. *H. bilineata*, p. 244.

275. (1.) **Homaloptera brucei.** (Fig. 85.)

Balitora brucei, *Gray and Hardw. Ill. Ind. Zool.* i, pl. 88, fig. 1.
Homaloptera brucei, *Day, Fish. India*, p. 526, pl. cxxii, fig. 1 (see synon.).

Cul-cundee, Tamil, "Stone Carp."

B. iii. D. 11 (3/8). P. 21. V. 11. A. 7 (2/5). C. 17. L. l. 70. L. tr. 10/7.

Length of head $6\frac{1}{2}$ in the total length. *Eyes*—$2\frac{1}{2}$ diameters from end of snout, 1 diameter from end of opercle. Snout broad and depressed, with sharp margins; rostral and maxillary barbels small. *Teeth*—pharyngeal, conical, 15 in one row. *Fins*—

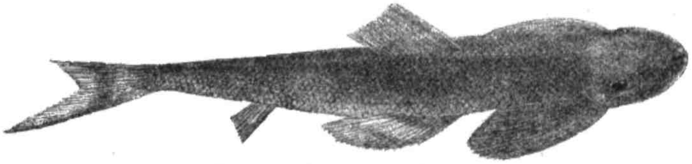

Fig. 85.—*Homaloptera brucei.*

pectoral nearly reaches the ventral, its anterior nine rays are unbranched, as are also the first two of the ventral. Lower caudal lobe much the longer. *Scales*—absent from chest and abdomen as far back as the posterior margin of the base of the ventrals. *Colour*—dark brown with darker blotches; caudal banded.

Hab. Wynaad and Bhaváni river in Madras, Himalayas from about Darjeeling through Bhutan, Assam, and the Khasi Hills.

276. (2.) **Homaloptera maculata.**

Balitora maculata, *Gray and Hardw. Ill. Ind. Zool.* i, pl. 88, fig. 2.
Homaloptera maculata, *Day, Fish. India*, p. 526, pl. cxxii, fig. 2 (see synon.).

B. iii. D. 10 (2/8). P. 19. V. 9. A. 7 (2/5). C. 17. L. l. 70.

Length of head $5\frac{3}{4}$ to 6 in the total length. *Eyes*—diameter one

D. 10, A. 7, L. l. 36. 4 barbels. Interorbital space concave. Head $6\frac{1}{4}$ to $6\frac{1}{2}$ in the total length .... 2. *D. jerdoni*, p. 247.
D. 10, A. 6, L. l. 35. 4 barbels. Interorbital space flat; 5 outer pectoral rays unbranched 3. *D. modestus*, p. 247.

279. (1.) Discognathus lamta. (Fig. 87.)

Cyprinus lamta, *Ham. Buch. Fish. Ganges*, pp. 343, 393.
Discognathus lamta, *Day, Fish. India*, p. 527, pl. cxxii, fig. 4, and pl. cxxiii, fig. 1 (see synon.).

Kul korava, Tam.; "The stone Ophiocephalus, *Pandi-pakkee*, Can."; *Korafi-kaoli*, Hind. (Mysore); *Putter-chettah*, Hind. (N.W. Provinces); *Choak-si*, Beng.; *Dhoguru* and *Khooka*, Punj.; *Malavya*, Maráthi.

B. iii. D. 11 (3–2/8–9). P. 15. V. 9. V. 7 (2/5). C. 17. L. l. 32–36. L. tr. 4–$4\frac{1}{2}$/5. Vert. 18–14.

Length of head 5 to $5\frac{1}{2}$ in the total length. *Eyes*—situated in the commencement of the last half of the head, more rarely in its centre; diameter 5 to 8 in the length of head, $2\frac{1}{2}$ to 3 diameters apart. Interorbital space convex. Snout very diversified, either smooth or covered with pores, and having or not having a deep

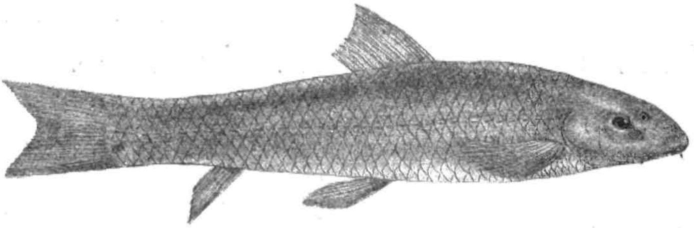

Fig. 87.—*Discognathus lamta.*

transverse depression: in some specimens, as from the Salt Range in the Punjab, or from the Chumba State, there is a regular spiny covering to a gland on either side of the snout; in some all the glands are thus constructed. *Fins*—the dorsal arises anteriorly to the origin of the ventral, and is usually less in height than the body. The pectoral shorter than the head. In some forms, and those mostly from rapid streams, the five outer pectoral rays are thickened by a wide layer of skin, the ray itself being either undivided or branched out just at its outer extremity or near to it; caudal slightly lobed. *Air-bladder*—small, its posterior portion minute. Ova small, numerous. *Colour*—greenish, with a bluish-green band along the centre of the body, and extending along the middle of the caudal fin. Generally a dark spot behind the gill-opening. Abdomen yellowish green. Fins yellowish, stained darker at their margins. In some specimens a black spot exists at the base of each dorsal ray, and all the fins are occasionally tipped with black. In Malabar and Canara some have a dark band along the side, with an orange one above and another below it.

Hab. From Syria throughout India and Ceylon to the Tenasserim Provinces, and likewise found in Abyssinia and at Aden. It attains at least 8 inches in length.

280. (2.) Discognathus jerdoni.

Discognathus jerdoni, *Day, Fish. India,* p. 528, pl. cxxii, fig. 6 (see synon.).

B. iii. D. 10 (2/8). P. 16. V. 9. A. 7 (2/5). C. 17. L. l. 36. L. tr. $4\frac{1}{2}/2\frac{1}{2}$.

Length of head $6\frac{1}{4}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ to 4 in the length of the head, 1 diameter from end of snout, and 2 diameters apart. Interorbital space rather deeply concave. Snout in the young smooth, but in larger specimens it has a depression across it and some pores. *Barbels*—two pairs. *Fins*—dorsal arising about midway between the end of snout and commencement of the origin of the anal fin. The pectoral is rather longer than the head, but does not quite reach the ventral, which is equally long. Anal does not quite reach the caudal, which is deeply forked. *Colour*—olivaceous, becoming yellowish on the sides and beneath. A black spot behind the gill-opening. Pectoral and ventral fins yellowish, with the outer portion dark grey margined with orange. Dorsal, anal, and caudal yellowish, with grey markings; the lower caudal lobe grey, with a light outer edge.

Hab. Bhaváni river at foot of Nilgiris in the Madras Presidency, also the Wynaad.

281. (3.) Discognathus modestus.

Mayoa modesta, *Day, P. Z. S.* 1869, p. 553.
Discognathus modestus, *Day, Fish. India,* p. 528, pl. cxxii, fig. 5.

B. iii. D. 10 (2/8). P. 15. V. 9. A. 6 (1/5). C. 19. L. l. 35. L. tr. $4\frac{1}{2}/3\frac{1}{2}$.

Length of head $5\frac{1}{4}$ in the total length. *Eyes*—near the upper surface of the head, diameter one fourth of length of head, 2 diameters from end of snout, 2 diameters apart. Head broad, depressed. Interorbital space flat. Lower surface of head and chest flat. The snout overhangs the mouth, which is rather small, transverse, and nearly semilunar in shape. The lips are reflected from off both jaws, and have a tuberculated surface. *Barbels*—four. *Teeth*—pharyngeal, uncinate, 5, 3, 1/1, 3, 5. *Fins*—pectorals and ventrals horizontal, the former extending to the latter, which reaches the anal. First five outer pectoral rays simple. Dorsal arises in advance of the ventral. Caudal slightly forked. *Scales*—none on the chest. *Colour*—greenish brown, with no marks except a dark blotch under the dorsal fin and a mark at the base of the caudal.

Hab. Probably Northern India; two specimens exist in the Calcutta Museum, the longest measuring $3\frac{1}{2}$ inches.

4. Genus **OREINUS**, McClelland.

Schizothorax, Sect. A, and *Schizopyge*, sp., Heckel.

Abdomen rounded. Snout rounded; mouth inferior and transverse, mandibles short, broad, and flat, loosely joined together at the symphysis; margin of the lower jaw having a hard, horny covering, thickest internally, and a thick fringed lower lip with a free posterior edge, forming a sucker. Barbels four. Dorsal fin rather short and arising opposite the ventrals, its last undivided ray osseous or articulated, serrated or entire; anal short. Scales very small; the vent and base of the anal fin in a sheath covered by an enlarged imbricate row of scales. Lateral line passing to the centre of the base of the caudal fin.

Geographical Distribution. Rivers and some lakes in the Himalayan and sub-Himalayan region, extending to the confines of China. These fishes are rarely found in the rivers of the plains at any distance from the base of the mountain-ranges.

The present and the four succeeding genera, *Schizopygopsis*, *Schizothorax*, *Ptycobarbus*, and *Diptychus*, consist of carps scaleless or more or less covered with minute scales. A membranous slit exists anterior to the anal fin, which is laterally bounded by a row of vertically-placed scales, like eave-tiles, continued along the base of the anal fin. These genera form the *Schizothoracinæ* of McClelland.

Synopsis of Indian Species.

D. 4/7, A. 3/5. Anal scales about half as large as orbit. Black spots on body......	1. *O. sinuatus*, p. 248.
D. 3/8, A. 3/5. Anal scales two thirds as large as orbit. Colours uniform	2. *O. richardsonii*, p. 250.
D. 3/8, A. 3/5. Anal scales about as large as orbit. Osseous dorsal ray weak. Colours uniform	3. *O. plagiostomus*, p. 250.

282. (1.) **Oreinus sinuatus.** (Fig. 88.)

Schizothorax sinuatus, *Heckel, Fisch. Caschmir*, p. 21, t. 2.
Oreinus sinuatus, *Day, Fish. India*, p. 529, pl. cxxiv, fig. 4 (see synon.).

Gool-goolli and *Saul*, Punj.; *Jis*, Cash.

B. iii. D. 3–4/8. P. 17. V. 10. A. 2–3/5. C. 19. L. l. 105. Vert. 24/23.

Length of head $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter two ninths to one sixth of length of head, 2 to $2\frac{1}{4}$ diameters apart, and almost entirely situated in the front half of the head. Interorbital space rather convex; snout rounded, with a very slight appearance of pores. Mouth inferior, transverse; lower lip well developed, rugose, entire, having a free posterior edge, and forming an adhesive sucker. The posterior edge may be concave or slightly lobed in the middle or even straight. Inner side of lower

lip covered with cartilage, which is extended on to the inferior surface, where, however, it is not so horny. *Barbels*—of about

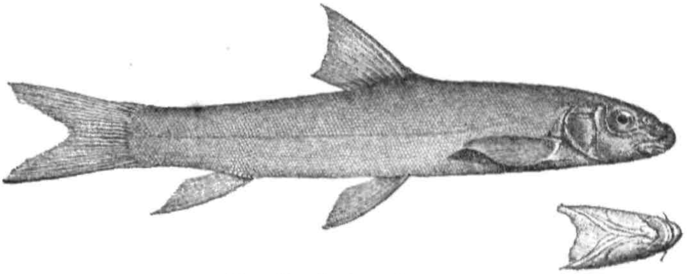

Fig. 88.—*Oreinus sinuatus.*

equal length, and not quite so long as the eye. Preopercle with an emarginate posterior border. *Teeth*—pharyngeal, 5, 3, 2/2, 3, 5, crooked, pointed. *Fins*—dorsal commences a little before the ventrals, and slightly nearer to the snout than to the base of the caudal fin; its spine is rather strong, moderately serrated, and rather longer than the head without the snout; the fin is rather higher than the body below it. Pectoral four fifths as long as the head, and extending above halfway to the ventral, which last reaches two thirds of the distance to the anal, its last ray divided to its base. The anal has a narrow base and its length slightly varies, reaching, when laid flat, the whole or only three fourths of the distance to the base of the caudal, which is lobed in its posterior half. Free portion of tail slightly longer than deep. *Scales*—rows above the lateral line about equal in size to those of the pierced row, rather smaller below it: about 16 to 20 rows between the lateral line and base of ventral fin, and 21 to 25 between it and base of dorsal; tile-like row to vent minute, each scale in it being from one third to half the diameter of the orbit. In May (at Chumba) the ova of these fish inhabiting the main stream were almost fully developed, being numerous and of a large size. *Colour*—greyish, becoming white below, preopercle dashed with golden; lower fins tinged red. After death two or three rows of dark grey blotches appear above the lateral line. Some have scattered black and occasionally red spots, and these have been termed Trout.

Hab. Afghanistan, Himalayan rivers, but not extending in the plains to far from the base of the mountains. This fish adheres to rocks by means of its sucker, and is thus enabled to reside in mountain rapids. It attains at least 2 feet in length, is pretty good eating, but bony; it is too rich for some people, but does not deleteriously affect those used to it.

283. (2.) Oreinus richardsonii.

Cyprinus richardsonii, *Gray & Hardw. Ill. Ind. Zool.* i, pl. 94, fig. 2.
Oreinus richardsonii, *Day, Fish. India*, p. 530, pl. cxxv, fig. 4 (see synon.).

"Kemaon Trout," *Asla*, Nepaul.

B. iii. D. 11 (3/8). P. 17. V. 10. A. 7 (2/5). C. 19.
L. l. 98–100. L. r. 140.

Length of head 4 to 6 in the total length. *Eyes*—in the middle or rather before the middle of the length of the head, diameter 5 to $6\frac{1}{2}$ in the length of head; width of interorbital space in adults almost flat, and nearly equal to one half length of head. A well-developed lower lip, which has its posterior free edge straight or convex. *Barbels*—about one half as long as eye. *Teeth*—pharyngeal, 4, 4, 2/2, 4, 4, crooked, pointed. *Fins*—dorsal commencing about midway between the snout and base of the caudal, its spine moderately strong, toothed, becoming nearly smooth in large specimens, and as long as the head excluding the snout. Pectoral four fifths as long as the head. Ventral not reaching anal, nor the latter the caudal. *Scales*—24 rows between the lateral line and base of the dorsal fin, and 19 between lateral line and ventral; the scales of the tile-like row equal two thirds of the diameter of the eye in the young, and are as high as the diameter of orbit in adults. Free portion of the tail as long as deep. *Colour*—bluish along the back, becoming silvery shot with gold on the sides and beneath. Head likewise glossed with purple and gold. In some specimens there are black spots on the sides and head.

Hab. Nepal, Bhutan, and the sub-Himalayan range.

284. (3.) Oreinus plagiostomus.

Schizothorax plagiostomus, *Heckel, Fisch. Caschmir*, p. 16, pl. 1.
Oreinus plagiostomus, *Day, Fish. India*, p. 530 (see synon.).

B. iii. D. 10–11 (2–3/8). P. 17. V. 11. A. 7 (2/5). C. 19.
L. l. 110. L. r. 170.

Length of head $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 8 in the length of head, and in or rather before the middle of the length of the head. Interorbital space nearly flat, and equalling about one half length of head; lower lip with a nearly straight and free posterior margin, and studded with glands; some specimens have glands on the snout. *Barbels*—not so long as the eye. *Teeth*—pharyngeal, crooked, pointed, 5, 4, 2/2, 4, 5. *Fins*—dorsal osseous ray weak, its stiff portion as long as the head without the snout, its serrature feeble, almost absent in adults; the fin is not so high as the body, it commences midway between the end of the snout and the root of the caudal; anal when laid flat reaches the base of the caudal; the scales along its base well developed, the largest being about the size of the orbit in the young, exceeding it in the adult. *Colour*—uniform silvery, or with black spots.

5. Genus **SCHIZOPYGOPSIS**, Steindachner.

Abdomen rounded. Snout obtusely conical. Mouth transverse, inferior, with a slight cleft; mandible with a sharp anterior edge, having a horny covering, and the upper lip continuous with a short lateral one. Barbels absent. Pharyngeal teeth compressed, 4 or 3, 3/3, 3 or 4. Dorsal fin short, with a serrated ray, and situated nearly opposite to the ventrals; anal short. Scales small, few, and only present in the scapular region, except a scaled sheath to the vent and along the base of the anal fin. Lateral-line continued to the centre of the base of the caudal. Ova comparatively large.

285. (1.) **Schizopygopsis stoliczkæ.** (Fig. 89.)

Schizopygopsis stoliczkæ, *Steind. Verh. z.-b. Ges. Wien*, 1866, p. 786; *Day, Fish. India*, p. 531, pl. cxxiv, fig. 2.

B. iii. D. 10–11 (3–4/7–8). P. 13. V. 11. A. 7 (2/5). C. 19.

Length of head 5 to $5\frac{3}{4}$ in the total length. *Eyes*—diameter 4 to 5 in the length of the head, 1 to $1\frac{1}{2}$ diameters from the end of the snout, and $1\frac{1}{2}$ to 2 apart. The greatest width of the head equals its length behind the middle of the eyes, and its height equals its length excluding the snout. The maxilla reaches to below the front edge of the eye. An anterior, sharp, horny edge

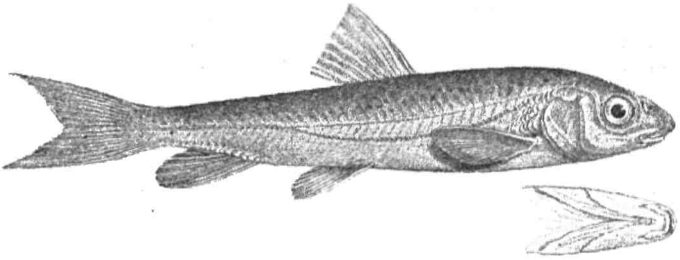

Fig. 89.—*Schizopygopsis stoliczkæ.*

to the mandible. *Fins*—the dorsal as high as the body, it commences about midway between the end of the snout and the root of the caudal fin, its last undivided ray osseous and finely serrated. Pectoral not quite so long as the head, and reaching rather above halfway to the ventral, which latter arises below the middle of the dorsal and does not reach the anal. Anal rather above twice as high as its base is long, it extends to the caudal when laid flat. Caudal deeply forked. *Colour*—olive superiorly, becoming white on the sides and beneath, the whole covered with irregular blackish spots.

Hab. Leh and head-waters of Indus, also tributaries of the Yarkand and Oxus rivers.

6. Genus **SCHIZOTHORAX**, Heckel*.

Syn. *Schizopyge*, sp., Heckel; *Racoma*, sp., McClell.; *Opistocheilus*, pt., Bleeker.

Abdomen rounded. Snout conically rounded, and laterally somewhat compressed, with the mouth arched and antero-inferior; mandible neither broad, flattened, nor with a sharp margin, its edge sometimes having a thin, deciduous horny covering. Barbels four. Pharyngeal teeth pointed, hooked, 5, 3, 2/2, 3, 5. Dorsal fin rather short, with a strong, osseous, serrated ray, and arising opposite the ventrals; anal short. Scales very small, the vent and base of the anal fin in a sheath, covered by an enlarged row arranged like tiles. Lateral line passing to the centre of the base of the caudal fin.

Geographical Distribution. Mountain-streams and rivers of the Himalayan region, also Afghanistan and Turkestan.

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* The following species of this genus have also been recorded:—

A. *Lower labial fold uninterrupted.*

a. Dorsal spine strong, serrated.

1. *Schizothorax barbatus*, McClelland, Calc. Jour. N. H. ii, p. 580.—Afghanistan.

b. Dorsal spine feeble, serrated.

2. *S. ritchcana*, McClelland, *l. c.* p. 580.—Afghanistan.
3. *S. edeniana*, McClelland, *l. c.* p. 579.—Cabul river.

B. *Lower labial fold interrupted. Dorsal spine strong, serrated.*

4. *S. niger*, Heckel, Fische aus Caschmir, p. 29, pl. v.—Kashmir.
5. *S. punctatus*, Day, P. Z. S. 1876, p. 785.—Kashmir.
6. *S. micropogon*, Heckel, *l. c.* p. 41, t. viii, fig. 1.—Kashmir.
7. *S. planifrons*, Heckel, *l. c.* p. 44, t. viii, fig. 2.—Kashmir.
8. *S. huegelii*, Heckel, *l. c.* p. 36, pl. vii.—Kashmir.
9. *S. curvifrons*, Heckel, *l. c.* p. 25, pl. iii.—Kashmir.
10. *S. intermedius*, McClelland, *l. c.* p. 579; Day, *l. c.* p. 786, pl. cxxiv, fig. 1.—Afghanistan and Turkestan.
11. *S. nasus*, Heckel, *l. c.* p. 32, pl. vi.—Kashmir.
12. *S. microcephalus*, Day, *l. c.* p. 787, pl. cxxv, fig. 2.—From a tributary of the Oxus Panja.
13. *S. longipinnis*, Heckel, *l. c.* p. 27, t. iv.—Kashmir.
14. *S. chrysochlorus*, Day, *l. c.* p. 784; *Racoma chrysochlora*, McClelland, *l. c.* p. 577, t. xv, fig. 3; *S. biddulphi*, Günther, A. M. N. H. ser. 4, xvii, 1876, p. 400.—Afghanistan and Turkestan.
15. *S. nobilis*; *Racoma nobilis*, McClelland, *l. c.* p. 577, t. xv, fig. 4.—Afghanistan.
16. *S. labiatus*, McClelland, *l. c.* p. 578, t. xv, fig. 1.—Afghanistan.
17. *S. gobioides*; *Racoma gobioides*, McClelland, *l. c.* p. 576, t. xv, fig. 3.—Afghanistan.
18. *S. brevis*; *Racoma brevis*, McClelland, *l. c.* p. 578.—Afghanistan.

Amongst the foregoing 18 species it is most probable that several will turn out to be synonyms; some of those described by McClelland may belong to the genus *Oreinus*.

Synopsis of Indian Species.

D. 11–12, A. 7, L. l. 150. Snout elongate.
Lower lip with a free posterior edge ...... 1. *S. progastus*, p. 253.
D. 12, A. 7. Lower labial fold interrupted.... 2. *S. esocinus*, p. 254.

286. (1.) **Schizothorax progastus.** (Fig. 90.)

Oreinus progastus, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 274, 343, pl. 40, fig. 4.
Schizothorax progastus, *Day, Fish. India*, p. 532, pl. cxxii, fig. 7 (see synon.).

Dinnawah, N.W. Prov.; *Adoee* and *Loh-one*, Assamese.

B. iii. D. 11–12 (3/8–9). P. 19. V. 11. A. 2/5. C. 19. L. l. 150–160.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. *Eyes*—from $4\frac{1}{2}$ to 6 diameters in the length of the head and situated in its middle. Snout pointed. Depth of cleft of mouth equals the width of the gape. Upper jaw projecting; lip thick and fleshy, having a free posterior edge in its whole circumference, upper lip elevated in the centre, lower with a central lobe and a lateral one on either side. Lips internally covered with a thin, deciduous, cartilaginous layer. *Barbels*—four, the rostral about as long as the orbit, the maxillary pair rather shorter. *Fins*—dorsal commences midway between

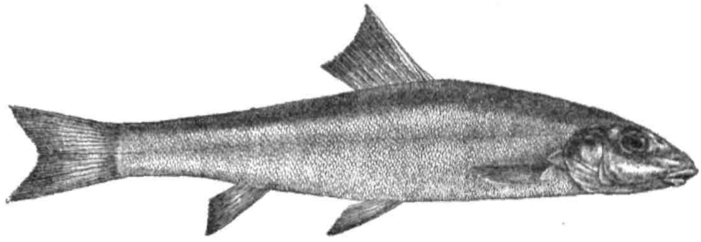

Fig. 90.—*Schizothorax progastus.*

end of snout and root of caudal fin, its osseous ray strong, coarsely serrated, and as long as the head behind the angle of the mouth. The pectoral does not reach the ventral, nor the latter the anal. Anal when laid flat nearly reaches the base of the caudal, which is deeply forked. *Scales*—in tile-like rows but little developed, the largest not being half as broad as the orbit. About 18 rows between the lateral line and base of ventral fin. *Colour*—uniform silvery, sometimes having a few fine spots; fins with darkish edges.

Hab. Himalayas, from the head-waters of the Ganges to Sadiya in Upper Assam. Common at Hardwar, where the Ganges debouches into the plains. It attains at least 20 inches in length.

287. (2.) **Schizothorax esocinus.**

Schizothorax esocinus, *Heckel, Fisch. Caschmir*, p. 48, t. ix; *Day, Fish. India*, p. 533, pl. cxxiii, fig. 4 (see synon.).

B. iii. D. 12 (4/8). P. 20. V. 10. A. 7 (2/5). C. 20.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $6\frac{1}{2}$ in the length of head, 2 diameters from the end of snout, and also apart. The upper jaw the longer; the maxilla reaches to nearly below the front edge of the eye. Lower labial fold interrupted in the middle. A horny covering to inside of the lower jaw. *Barbels*—the rostral more than half longer than the eye, the maxillary a little shorter. *Fins*—the dorsal as high as the body, commencing slightly nearer to the base of the caudal than to the end of the snout; its last undivided ray osseous, coarsely serrated posteriorly, whilst its bony portion is as long as the head excluding the snout. The pectoral does not quite reach the ventral; the latter, which arises beneath the second or third undivided dorsal ray, extends two thirds of the distance to the anal. Length of base of anal about three sevenths of its height, when laid flat the anal reaches the caudal, which is deeply forked. Free portion of the tail as high at its base as it is long. *Colour*—silvery, with numerous black spots, most distinct in the upper half of the body.

Hab. Leh or Ladak and head-waters of the Indus, also Kashmir and Afghanistan.

7. Genus **PTYCHOBARBUS**, Steindachner.

Abdomen rounded; snout conical; mouth arched, anterior or inferior. Two maxillary barbels. Pharyngeal teeth compressed 4, 3/3, 4. Dorsal fin situated opposite the ventrals, without or with a feeble osseous ray, which is smooth or serrated; anal short. Scales small, covering the body, and forming a sheath at the base of the vent and anal fin. Lateral line continued to the centre of the base of the caudal.

Geographical Distribution. Head-waters of the Indus, Tibet and Kashgar.

288. (1.) **Ptychobarbus conirostris.** (Fig. 91.)

Ptychobarbus conirostris, *Steind. Verh. z.-b. Ges. Wien*, 1866, p. 790, pl. 17, fig. 4; *Day, Fish. India*, p. 533, pl. cxxv, fig. 3.

B. iii. D. 10 (2/8). P. 22. V. 10. A. 7–8. C. 19.
L. l. 95. L. tr. 24/—.

Length of head $4\frac{3}{4}$ to 5 in total length. *Eyes*—diameter from $4\frac{1}{4}$ to $5\frac{1}{4}$ in the length of head, 2 diameters from the end of snout, and $1\frac{1}{4}$ apart. Mouth rather overhung by the snout; the maxilla reaches to below the front edge of the orbit. Lower labial fold very broad, uninterrupted. *Barbels*—a maxillary pair, which in the adult reach to the hind edge of the preopercle. *Fins*—the dorsal, situated midway between the snout and the base of the

caudal fin, has no osseous ray, and is as high as the body below it. The pectoral is as long as the head behind the nostril, and does not quite reach the ventral, which latter arises beneath the last few dorsal rays, and extends two thirds of the distance to the base of the anal. Anal when laid flat reaches the base of the caudal, its

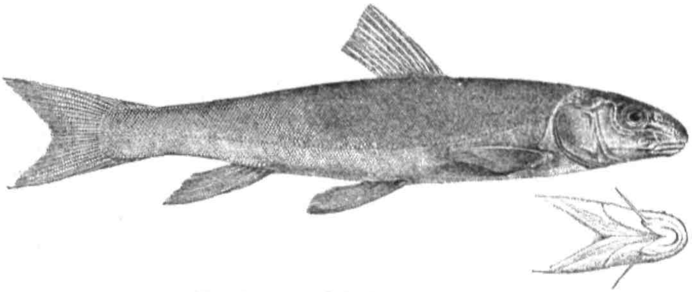

Fig. 91.—*Ptychobarbus conirostris.*

base is $2\frac{1}{3}$ in its height. *Scales*—the tile-like row small, not one third the diameter of the eye. *Colour*—silvery, darkest on the back and upper half of the body, where most of the scales have dark edges. Upper surface of the head spotted with black. Some dark spots on the dorsal fin, and sometimes a few light ones on the caudal.

Hab. Head-waters of the Indus and Tibet.

8. Genus **DIPTYCHUS**, Steindachner.

Abdomen rounded; snout obtuse; mouth inferior, transverse, curved; lower jaw sharp, with an internal horny covering; lips continuous and having an uninterrupted labial fold across the mandible. Two maxillary barbels. Gill-opening narrow. Pharyngeal teeth compressed 4, 3/3, 4. Dorsal fin without osseous ray, commencing anterior to the ventrals; anal short; caudal forked. Scales small, not imbricate but scattered along the upper two thirds of the body, the thoracic region, the sides and the tail, also a scaly sheath to the vent and base of the anal fin. Lateral line continued to the centre of the base of the caudal.

289. (1.) **Diptychus maculatus.** (Fig. 92.)

Diptychus maculatus, *Steind. Verh. z.-b. Ges. Wien,* 1866, p. 788, t. 13, fig. 5; *Day, Fish. India,* p. 534, pl. cxxiv, fig. 3 (see synon.).

B. iii. D. 10–11 (2–3/8–9). P. 19. V. 9. A. 7 (2/5). C. 19. L. l. 80–90.

Length of head 5 to 6 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in the young to 6 in the adult in the length of the head, $1\frac{1}{4}$ to 2 diameters from the end of the snout, and $1\frac{1}{2}$ apart. Lower labial fold interrupted in the middle. *Barbels*—a pair on the maxilla hardly so long as the eye. *Fins*—dorsal as high as the body,

arising rather nearer the snout than the base of the caudal fin, the last undivided ray articulated. Pectoral not quite so long as the head and reaching rather above halfway to the ventral, which latter commencing below the last dorsal ray extends halfway to

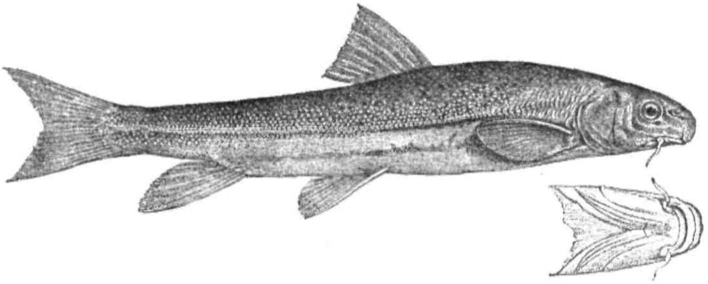

Fig. 92.—*Diptychus maculatus.*

the anal. Height of anal nearly three times the length of its base, laid flat the anal reaches the caudal. *Scales*—scattered over the upper two thirds of the body and pectoral region. Tile-like row well developed. Free portion of tail one half longer than high at its base. *Colour*—bluish, lightest inferiorly, indistinctly blotched and spotted in the upper half of the body; often a narrow dull band along the lateral line, and a second below it. In some specimens the dorsal and caudal fins are much spotted.

Hab. Head-waters of the Indus, Tibet, Nepal, and affluents of the Yarkand river.

9. Genus **LABEO**, Cuvier.

Syn. *Bangana*, pt., Ham. Buch.; *Rohita*, pt., Cuv. and Val.; *Tylognathus*, Heckel; *Nandina*, Gray; *Hypselobarbus*, *Diplocheilus*, *Diplocheilichthys*, *Lobocheilus*, *Rohitichthys*, *Morulius*, *Schismatorhynchus*, and *Gobionichthys*, Bleeker; *Gobiobarbus*, Dybowski; *Paralytognathus*, Sauvage.

Body moderately elongated, abdomen rounded; mouth sometimes anterior but mostly inferior, transverse, and semi-oval. Lips thick, covering the jaws, continuous at the angle of the mouth, and one or both having an inner transverse fold. A soft and movable horny covering, with a sharp margin on the inner side of one or both lips. Snout rounded, generally projecting beyond the mouth, mostly covered with tubercles, and sometimes having a lateral lobe or projection. Barbels, when present, four or two; if there is only one pair they are on the maxilla, the second being on the snout. Pharyngeal teeth hooked and in three rows, generally 5, 4, 2/2, 4, 5. Dorsal fin of moderate length or elongate, destitute of any osseous ray, and arising anterior to the commencement of the ventral. Anal short. Scales of large, moderate, or small size. Lateral line running along the middle of the side of the tail. Gill-rakers usually short.

The horny layer, which is so common inside of the lips of the *Schizothoracinæ*, is still perceptible in the fishes of this genus, but in many of those of the plains takes on the character more of a thin cartilaginous than of a horny covering. The snout has sometimes a deep depression across it as observed in *Discognathus*. The fins frequently increase in height and length more rapidly than do the proportions of the body; in adults the upper edge of the dorsal fin is often more concave than in the young. The largest species are found near the coldest hills, pointing to their probable Palæarctic origin. In some species having the least number of dorsal rays, the lips are much thinner than in the typical *Labeos*; should such have only two barbels these are maxillary, whereas in *Cirrhina* they would be rostral.

Geographical Distribution. Tropical Africa, Syria, throughout the fresh waters of India, Ceylon, and Burma, to the Malay Archipelago, &c.

Synopsis of Indian Species.

D. 24–26, L. l. 42–44, L. tr. 6–7/8. 4 barbels	1. *L. nandina*, p. 258.
D. 19–22, L. l. 44–47, L. tr. 9–10/8–9. 4 barbels	2. *L. fimbriatus*, p. 258.
D. 17–18, L. l. 36, L. tr. 6/7. 4 barbels. Nearly black	3. *L. nigrescens*, p. 259.
D. 16–18, L. l. 40–44, L. tr. $7\frac{1}{2}/8$. 4 barbels. Slate-colour	4. *L. calbasu*, p. 259.
D. 17, L. l. 46–47. 2 maxillary barbels. Dark grey	5. *L. stoliczkæ*, p. 260.
D. 15–17, L. l. 71–84, L. tr. 16/17. 4 barbels	6. *L. gonius*, p. 261.
D. 15–16, L. l. 53–55, L. tr. 8–9/9. 4 barbels	7. *L. dussumieri*, p. 262.
D. 15–16, L. l. 40–42, L. tr. $6\frac{1}{2}/9$. 4 barbels	8. *L. rohita*, p. 262.
D. 15–16, L. l. 39, L. tr. 7/8. 4 barbels	9. *L. porcellus*, p. 263.
D. 14, L. l. 39–40, L. tr. 8/7. A pair of maxillary barbels	10. *L. potail*, p. 264.
D. 15–16, L. l. 38–41, L. tr. 7/8. 4 barbels	11. *L. kontius*, p. 264.
D. 14, L. l. 40, L. tr. 6/11. 2 barbels	12. *L. cæruleus*, p. 265.
D. 13, L. l. 41–44, L. tr. 8/9. Mouth wide. 2 barbels	13. *L. diplostomus*, p. 265.
D. 13, L. l. 43, L. tr. $8\frac{1}{2}/7\frac{1}{2}$. 2 barbels	14. *L. dyochilus*, p. 266.
D. 13, L. l. 40–42, L. tr. $7\frac{1}{2}/8$. 2 barbels	15. *L. pangusia*, p. 266.
D. 12–13, L. l. 42, L. tr. 7/8. 2 or 4 barbels	16. *L. angra*, p. 267.
D. 11–12, L. l. 37–40, L. tr. 7/7. 2 barbels	17. *L. bata*, p. 268.
D. 12–13, L. l. 41–43, L. tr. 8/9. 2 barbels	18. *L. microphthalmus*, p. 268.
D. 12, L. l. 60, L. tr. 12–14. One pair of maxillary barbels	19. *L. boggut*, p. 269.
D. 11–12, L. l. 37–39, L. tr. 7/7. One pair of small maxillary barbels. Silvery	20. *L. boga*, p. 269.

D. 11, L. l. 38, L. tr. 8/9. One pair of maxillary barbels; a deep groove across snout	21. *L. nukta*, p. 270.
D. 11, L. l. 40–42, L. tr. 8/8. 2 barbels..	22. *L. nigripinnis*, p. 271.
D. 12–13, L. l. 43, L. tr. 8/9. 2 barbels..	23. *L. sindensis*, p. 271.
D. 11, L. l. 38, L. tr. 7/8. 2 barbels	24. *L. ariza*, p. 272.
D. 11, L. l. 38, L. tr. 6/6. 2 barbels	25. *L. kawrus*, p. 272.

290. (1.) Labeo nandina.

Cyprinus nandina, *Ham. Buch. Fish. Ganges*, pp. 300, 388, pl. viii, fig. 84.

Labeo nandina, *Day, Fish. India*, p. 535, pl. cxxvi, figs. 1 & 2 (variety *macronotus*) (see synon.).

Nandin, Beng.; *Nga-ohn-don*, *Nga-net-pyah*, *Nga-yin-pounsa*, and *Nga-thyn*, Burmese.

B. iii. D. 24–26 (2–3/22–24). P. 15. V. 9. A. 7 (2/5). C. 19. L. l. 42–44. L. tr. 6–7/8.

Length of head $4\frac{1}{2}$ to 5, of caudal fin $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ diameters from end of snout, and $2\frac{1}{2}$ apart. Dorsal profile rather concave above the eyes; interorbital space flat; the width of the mouth one third of the length of the head. Snout obtuse, slightly projecting beyond the jaws, no lateral lobe; a few fine pores on snout. Lips thick and fringed, with a distinct inner fold above and below. *Barbels*—four, short. *Fins*—the dorsal commences midway between the snout and the end of the base of the anal fin; its upper edge is somewhat convex. Caudal deeply forked. *Scales*—five rows between the lateral line and base of ventral fin. *Colour*—dark greenish above, becoming lighter on the sides and beneath; a few cloudy blotches along the sides; the centre of many of the scales reddish.

Hab. Bengal, Assam, and Burma. I have obtained this species as high up the Irrawaddy as Mandalay. Said to attain 3 feet in length, and 30 or 40 pounds in weight.

291. (2.) Labeo fimbriatus.

Cyprinus fimbriatus, *Bloch, Ich.* xii, p. 50, pl. 409; *Bl. Schn. Syst. Ich.* p. 441.

Labeo fimbriatus, *Day, Fish. India*, p. 536, pl. cxxvi, fig. 3 (see synon.).

Shaal, Tam.; *Ruchu* and *Gandumenu*, Tel.; *Bahrum*, Ooriah; *Tambra*, Maráthi.

B. iii. D. 19–22 (3–4/15–18). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 44–47. L. tr. 9–10/8.

Length of head $6\frac{1}{4}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ diameters from end of snout, and 2 apart. Dorsal profile more convex than that of the abdomen. The mouth slightly overhung by the snout, which is obtuse, rather swollen, and studded with minute pores, but destitute of a lateral

lobe. Lips thick, continuous, and having an inner fold above and below, both fringed. *Barbels*—rostral and maxillary pairs short. *Teeth*—pharyngeal, 5, 3, 2/2, 3, 5. *Fins*—dorsal commences somewhat nearer to the snout than to the base of the caudal, it is two thirds as high as the body, its upper edge concave. Pectoral nearly as long as the head, it does not reach the ventral. The ventral nearly extends to the anal, and the latter to the caudal. Caudal deeply forked. *Scales*—6 or 7 rows between the lateral line and the base of the ventral fin. *Colour*—silvery along the back, becoming lighter on the sides and beneath. Fins, more especially the ventral, anal, and lower caudal lobe, stained with black. Sometimes a diffused dark blotch, almost invariably present in the young, at the base of the caudal.

Hab. Sind, Punjab, the Deccan, and probably N.E. Bengal; also Southern India at least to Orissa, not recorded from Malabar or Canara. Attains a foot and a half in length, and is good eating, but bony.

292. (3.) **Labeo nigrescens.**

Labeo nigrescens, *Day, P. Z. S.* 1870, p. 371; *Fish. India*, p. 536, pl. cxxvii, fig. 2 (see synon.).

Mul-vel and *Kurri-minu*, Canarese.

B. iii. D. 17–18 (2–3/14–15). P. 19. A. 7 (2/5). C. 19–21. L. l. 36. L. tr. 6/7.

Length of head 5 in the total length. *Eyes*—diameter 4 to 5 in the length of head, 2 diameters from the end of snout and also apart. Snout rather swollen and rounded, and somewhat projecting over the lower jaw; a small lateral lobe; glands over the whole of the snout. A very distinct labial fold both above and below; a deep transverse groove across the chin; lower lip deeply fringed. *Barbels*—maxillary as long as the orbit, rostral rather shorter. *Fins*—dorsal commences midway between front end of snout and posterior end of base of anal fin. The pectoral reaches to above the ventral; the latter, which is inserted beneath the fourth dorsal ray, reaches to the anal. Anal rather elongated anteriorly, being three fifths higher than its base is long; if laid backwards it reaches the base of the caudal, which latter fin is deeply forked. *Scales*—4½ rows between the lateral line and base of the ventral fin. *Colour*—deep brown, each scale with a black spot at its base. Fins black.

Hab. Mangalore and South Canara; said to attain 18 inches in length.

293. (4.) **Labeo calbasu.** (Fig. 93.)

Cyprinus calbasu, *Ham. Buch. Fish. Gang.* pp. 297, 387, pl. ii, fig. 83.

Labeo calbasu, *Day, Fish. India*, p. 536, pl. cxxvi, fig. 4 (see synon.).

Nulla-gandu-menu, Telugu; *Kalbasu* and *Kundna*, Beng., and *Cuggera* (Soane); *Mahlee*, Assam; *Kala-beinse*, Ooriah and Hind.; *Di*, Punj.;

At Calcutta the form *L. gonius* is most common with D. 2/13, but I have seen two specimens with D. 2/14 from the locality. In Orissa and Ganjam the rows of scales along the lateral line are about 74, with only about 9 rows of scales between the lateral line and base of the ventral fin. To the north, as at Saharanpur, the scales along the lateral line only number 71, while there are 10 or 11 rows between it and the base of the ventral fin. In the Brahmaputra the form *L. gonius* is found as high as Gauhati, where it mostly has D. 2/14; with it is another variety (*L. cursis*) with D. 2/14, a rather higher body than is normal, the scales in rather irregular rows, some red spots on the sides, and about 15 rows of scales between the lateral line and base of the ventral fin.

Hab. Indus in Sind, through the N.W. Provinces, Bengal, and Orissa to Ganjam, as low as the Kistna; Assam and Burma. This species attains nearly 5 feet in length.

296. (7.) Labeo dussumieri.

Rohita dussumieri, *Cuv. & Val. H. N. Poiss.* xvi, p. 258, pl. 475.
Labeo dussumieri, *Day, Fish. India*, p. 538, pl. cxxvi, fig. 5 (see synon.).

Toolee, Mal.

B. iii. D. 15–16 (3/12–13). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 53–60. L. tr. 8–9/9.

Length of head $5\frac{3}{4}$ to 7 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diameters from end of snout, and 3 apart. Body elongated and compressed, the abdominal profile rather more convex than the dorsal. Mouth of moderate width and somewhat inferior, surrounded by fleshy, fringed lips, having a distinct inner fold above and below, but no lateral lobe. Sometimes numerous pores on the snout, extending posteriorly as far as the orbits, and below the nostrils. *Barbels*—four, minute. *Fins*—dorsal commences midway between the end of the snout and end of base of anal fin; its upper edge concave. Caudal very deeply forked. *Scales*—5 or $5\frac{1}{2}$ rows between the lateral line and the base of the ventral fin. *Colour*—greyish, lightest beneath; scales with a reddish centre, edged with a darker shade. Usually a dull diffused dark spot on either side of the tail. Fins dusky.

Hab. Rivers of South Malabar, Ceylon, and perhaps Bombay; attaining at least 13 inches in length.

297. (8.) Labeo rohita.

Cyprinus rohita, *Ham. Buch. Fish. Ganges*, pp. 301, 388, pl. 36, fig. 85.
Labeo rohita, *Day, Fish. India*, p. 538, pl. cxxvii. fig. 4 (see synon.).

Ruhu, Ooriah; *Ruee*, Beng.; *Nga-myit-chin*, *Nga-myit-tsan-nee*, and *Nga-thŷn*, Burmese; *Dum-bra*, Sind.

B. iii. D. 15–16 (3/12–13). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 40–42. L. tr. $6\frac{1}{2}$/9.

Length of head $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter 4 to 6 in the length of the head, $1\frac{3}{4}$ to 2 diameters from end of snout, and 3 apart. Dorsal profile more convex than that of the abdomen, somewhat concave over the orbit. Snout obtuse, depressed, not or scarcely swollen, but projecting beyond the jaws; no lateral lobe; lips rather thick, fringed, and with a distinct inner fold above and below. *Barbels*—a short and thin maxillary pair; a rostral pair said to be sometimes present. *Teeth*—pharyngeal, plough-shaped, 5, 4, 3/3, 4, 5. *Fins*—the dorsal arises about midway between the snout and the base of the caudal fin; it is not quite so high as the body, and its upper edge is moderately concave. Pectoral as long as the head excluding the snout. Ventral inserted below the third or fourth dorsal ray. Caudal deeply forked. *Scales*—6 to $6\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—bluish or brownish along the back, becoming silvery on the sides and beneath; sometimes there is a red mark on each scale. In some specimens the fins are black.

Hab. Fresh waters of Sind, and from the Punjab through India and Assam to Burma. Not found in Madras nor on the Western coast. This fish attains 3 feet or more in length. It is esteemed excellent as food, and propagated with care in ponds in Bengal.

298. (9.) Labeo porcellus.

Tylognathus porcellus, *Heckel, in Hügel's Kashmir*, iv, p. 385.
Labeo porcellus, *Day, Fish. India*, p. 539, pl. cxxviii, fig. 1 (see synon.).

B. iii. D. 15–16 (2/13–14). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 39. L. tr. 7/8.

Length of head 6 in the total length. *Eyes*—diameter 5 in the length of head, 2 diameters from the end of snout and also apart. Dorsal profile rather more convex than that of the abdomen. Snout rather projecting. Lips thick, with a distinct inner fold to both jaws, which have each a thin cartilaginous internal covering. Gill-rakers small and rather closely set. *Barbels*—four, the maxillary rather longer than the rostral pair. *Fins*—dorsal not quite so high as the body; it commences midway between the snout and the posterior end of the base of the anal fin, its upper edge is rather concave. Pectoral as long as the head; ventral rather shorter. *Scales*—5 rows between the lateral line and the base of the ventral fin. *Colour*—greyish superiorly, becoming dull white on the sides and beneath; most of the scales darkest at their edges. A dark spot usually present at the base of the caudal fin. Behind the centre of the opercle is a bluish spot, which may be continued on to the shoulder. Fins greyish, darkest along their centres.

Hab. Poona and Bombay. Found also in Ceylon (*Haly*).

299. (10.) Labeo potail.

Cyprinus potail, *Sykes, Tr. Z. S.* ii, p. 354.
Labeo potail, *Day, Fish. India,* p. 539, pl. cxxvii, fig. 3 (see synon.).

Dotondi, Mahr.

B. iii. D. 13–14 (2/11–12). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 39–40. L. tr. 8/7.

Length of head $5\frac{1}{2}$ in the total length. *Eyes*—situated in the commencement of the posterior half of the head, from 4 to 6 diameters in the length of the head. Dorsal profile rather more convex than that of the abdomen. Mouth narrow. Snout overhanging the mouth, with a slightly produced lateral lobe; lower labial fold entire, a deep groove existing across the chin. Snout smooth, or with fine pores. A cartilaginous layer to inner side of both jaws. *Barbels*—a maxillary pair. *Fins*—dorsal commences rather nearer the snout than the base of caudal fin, its upper margin is a little concave; the height of the fin two thirds that of the body. Pectoral nearly as long as the head, and equal to the ventral in length. Anal much highest anteriorly; caudal deeply forked, upper lobe the longer. *Scales*—$5\frac{1}{2}$ rows between lateral line and base of ventral. *Colour*—greyish, each scale with a red lunule; fins stained grey along their edges, and dorsal along its centre.

Hab. Deccan, from Poona to Tungabhadra river.

300. (11.) Labeo kontius.

Cyprinus kontius, *Jerdon, Mad. Jour. L. S.* xv, p. 302 (1849).
Labeo kontius, *Day, Fish. India,* p. 539, pl. cxxvii, fig. 5 (see synon.).

Currumunnee condee and *Curoo-moolee-candee,* Tam.

B. iii. D. 15–16 (3–4/12–13). P. 15. V. 10. A. 7 (2/5). C. 19. L. l. 38–41. L. tr. 7/8.

Length of head 6 to 7 in the total length. *Eyes*—in the immature usually in the middle of the length of the head, in the adult in the commencement of its last half, diameter $4\frac{3}{4}$ to 5 in the length of the head. Profile above the eyes rather concave. Dorsal profile more convex than the abdominal. Muzzle blunt truncated, covered with pores, and having a short fleshy lateral prolongation. Width of mouth $2\frac{1}{3}$ in the length of the head. Lips thick, with a distinct inner fold below; the lower one is fringed. Snout overhanging the mouth. *Barbels*—four, short. *Teeth*—pharyngeal, plough-shaped, 5, 4, 2/2, 4, 5. *Fins*—dorsal commences midway between snout and hind end of base of anal, its upper margin is concave. Pectoral reaches to nearly above the ventral; the latter does not reach the anal. Caudal deeply forked. *Scales*—5 rows between lateral line and base of ventral. *Colour*—a general reddish or fleshy tinge, darkest along the back. In most of the

specimens obtained from the Coleroon river, each scale had a red centre.

Hab. Rivers along the base of the Nilgiris, and the Cauvery and Coleroon in all their branches down to the coast. Grows to two feet in length.

301. (12.) Labeo cæruleus.

Labeo cæruleus, *Day, Fish. India,* p. 540, pl. cxxix, fig. 3.

B. iii. D. 14 (2/12). P. 18. V. 9. A. 7 (2/5). C. 19.
L. l. 40. L. tr. 6/11.

Length of head $4\frac{3}{4}$ in the total length. *Eyes*—4 diameters in the length of head, 1 diameter from the end of snout, and 2 apart. Mouth narrow, its width equalling two sevenths of the length of the head. Snout overhanging the mouth; no lateral lobe. Lips continuous, and having a distinct inner fold in their entire circumference; both lips fringed. A horny inner covering to either lip. *Barbels*—a short pair to the maxilla. *Fins*—dorsal arises anteriorly to the ventral, and slightly nearer to the end of the snout than to the base of the caudal fin, in front it is two thirds as high as the body, its upper edge concave. Pectoral as long as the head excluding the snout, it does not reach the ventral nor the latter the anal. Anal when laid flat reaches the base of the caudal, which is deeply forked. *Scales*—6 rows between lateral line and base of ventral fin. *Colour*—bluish, with a yellowish tinge on the sides and beneath. Outer half of anal nearly black, and a blackish lunule on the caudal.

Hab. River at the base of the Sind Hills.

302. (13.) Labeo diplostomus.

Varicorhinus diplostomus, *Heckel, Fisch. Caschmir,* p. 67, pl. xi.
Labeo diplostomus, *Day, Fish. India,* p. 540, pl. cxxix, fig. 2 (see synon.).

Nepura, Assam; *Kul-ka-batta,* Beng.; *Gid* and *Giddah,* Punj.; *Mohaylee,* Hind. (Hurdwar), and *Gaywah,* Saharanpur.

B. iii. D. 12–13 (2–3/9–10). P. 17. V. 9. A. 7 (2/5). C. 19.
L. l. 41–44. L. tr. 8/9.

Length of head $5\frac{1}{2}$ to $6\frac{1}{4}$ in the total length. *Eyes*—situated either in or (in the young) rather before the middle of the length of the head, diameter 5 to $6\frac{1}{2}$ in the total length of head, and $2\frac{1}{2}$ to 3 diameters apart. Dorsal profile more convex than that of the abdomen. Mouth rather narrow; snout overhanging the jaws, generally with a groove across it, and covered with pores; no lateral lobe. Lips thick and continuous, but the fold across the lower jaw is interruped. A cartilaginous layer on inside of both lips. Gill-rakers closely set, about one third as long as the eye. *Barbels*—a small maxillary pair. *Teeth*—pharyngeal, plough-shaped,

5, 4, 2/2, 4, 5. *Fins*—dorsal arises midway between the front of the snout and the end of the base of the anal fin; its upper edge is slightly concave in the young, becoming deeply so in the adult. The pectoral does not extend to the ventral, nor the latter to the anal. Caudal deeply forked, the upper lobe the longer. *Scales*—six or seven rows between lateral line and base of ventral fin. *Colour*—greyish, darkest along the back, each scale tinged with red; a darkish band along the side, or short grey bars passing to the lateral line. Fins with a faint reddish hue. Outer edge of dorsal rather stained.

Hab. Along the Sind hills and Himalayas, also in the Brahmaputra in Assam.

303. (14.) **Labeo dyochilus.**

Cyprinus dyocheilus, *McClelland, As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 268, 330, pl. 37, fig. 1.
Labeo dyocheilus, *Day, Fish. India,* p. 540, pl. cxxx, fig. 1 (see synon.).

Boalla, Hind.; *Heel-gorya,* Assamese; *Nu-ga-dee,* Sind.

B. iii. D. 13 (2/11). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 43. L. tr. $8\frac{1}{2}/7\frac{1}{2}$.

Length of head 5 to $5\frac{1}{2}$ in the total length. *Eyes*—situated in the commencement of the posterior half of the head in the young, still further back in the adult; diameter from 6 to 9 in the length of the head, and from $3\frac{1}{2}$ to 5 apart. Width of head equals two thirds of its length; its lower surface being very broad and flat. Snout conical, projecting, and with a distinct lateral lobe. Mouth wide, its gape equal to one half to two fifths the length of the head, it is directed downwards when the upper jaw is protruded. Lips of both jaws continuous, the fold across the lower jaw interrupted. A horny inner covering to both lips. Pores on snout. *Barbels*—one short maxillary pair. *Teeth*—pharyngeal, plough-shaped, 5, 4, 3/3, 4, 5. *Fins*—dorsal commences midway between end of snout and posterior end of base of anal fin; its upper margin concave, especially in the adult. The pectoral reaches the ventral, and the latter the base of the anal. Caudal deeply forked, its inner rays about one third of the length of the outer. *Scales*—five rows between lateral line and base of ventral fin. *Colour*—dull green, darkest above; fins darkest in the centre.

Hab. Sind hills and along the Himalayas to Sikkim and Assam. Common in Assam. Attains at least 3 feet in length.

304. (15.) **Labeo pangusia.**

Cyprinus pangusia, *Ham. Buch. Fish. Ganges,* pp. 285, 386.
Labeo pangusia, *Day, Fish. India,* p. 541, pl. cxxxi, fig. 1 (see synon.).

Loannee, Beng.

B. iii. D. 13 (2/11). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 40–42. L. tr. $7\frac{1}{2}$/8.

Length of head $5\frac{2}{3}$ to 6, of caudal $4\frac{1}{2}$ to 5, height of body $4\frac{1}{2}$ in the total length. *Eyes*—in or rather behind the middle of the length of the head; diameter $4\frac{1}{2}$ to $5\frac{1}{2}$ in the length of the head. Dorsal profile more convex than that of the abdomen. The greatest width of the head equals two thirds of its length. Suborbital ring of bones narrow, about one fifth the diameter of the eye. Mouth narrow, its width $3\frac{3}{4}$ in the length of the head. Snout obtuse, projecting over the jaws, and having a very distinct lateral lobe. Lips not fringed, but thick, with a distinct inner fold, which is not continued across the lower jaw. Snout covered with large pores. A cartilaginous covering to inner surface of both lips. *Barbels*—a short maxillary pair, concealed in the labial fold. *Teeth*—pharyngeal, plough-shaped, 5, 4, 3/3, 4, 5. *Fins*—dorsal commences nearer the snout than the base of the caudal; it is nearly or quite as high as the body, and in the adult its upper edge is concave. The pectoral does not quite reach the ventral, nor the latter the anal. Caudal deeply forked. *Scales*—$5\frac{1}{2}$ to 6 rows between lateral line and base of ventral fin. *Colour*—of a dull green, becoming lighter on the sides and beneath, sometimes the base of each scale has a dark mark.

• *Hab.* Himalayan range and generally throughout Sind, the Deccan, and N.W. Provinces, to Bengal, Cachar, and Assam.

305. (16.) Labeo angra.

Cyprinus angra, *Ham. Buch. Fish. Ganges*, pp. 331, 391.
Labeo angra, *Day, Fish. India*, p. 541, pl. cxxviii, fig. 2 (see synon.).

Nga-loo, Burmese; (*Khársá*, Hind. at Purneah; *Mochhna* on the Mahanadi, H.B.'s MSS.).

B. iii. D. 12–13 (2–3/10). P. 16. V. 9. A. 7 (2/5). C. 19.
L. l. 42. L. tr. 7/8.

Length of head $5\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ in the length of the head, $1\frac{1}{4}$ to $1\frac{3}{4}$ diameters from the end of the snout, and 2 to $2\frac{1}{2}$ apart. Dorsal profile a little more convex than that of the abdomen. Snout overhanging the jaws, having a distinct lateral lobe on either side, and studded with pores. Mouth rather narrow, the lips continuous and with a deep groove across the chin; both lips fimbriated. *Barbels*—a short maxillary pair. *Fins*—dorsal as high as the body, arising rather nearer the snout than the base of the caudal fin, its upper edge concave. Pectoral nearly as long as the head. Ventral inserted beneath the first third of the dorsal. Caudal deeply forked. *Scales*—$5\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—brownish along the back, with a black or bluish stripe passing from the eyes to the base of the caudal fin, where it ends in a black blotch. In Burmese examples the black lateral band is wanting, but the blotch

at the side of the tail is present, and some have a second blotch at the commencement of the lateral line. Instead of a maxillary barbel there exists a fleshy flap inside the groove.

Hab. Assam, Bengal, and Orissa. Also Mandalay in Upper, and Sittoung in Lower Burma.

306. (17.) Labeo bata.

Cyprinus bata, *Ham. Buch. Fish. Ganges*, pp. 283, 386.
Labeo bata, *Day, Fish. India*, p. 542, pl. cxxix, fig. 5 (see synon.).

Dunguda-porah, Ooriah; *Dommarci-batta*, Beng.; *Gootellah*, Hind.; *Bango*, N.W. Prov.; *Chirri*, Cutch; *Royádi* and *Tambte*, Maráthi.

B. iii. D. 11–12 (2–3/9–10). P. 18. V. 9. A. 7 (2/5). C. 19. L. l. 37–40. L. tr. 7/6–7.

Length of head $5\frac{1}{2}$ to $5\frac{3}{4}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{3}$ in the length of head, $1\frac{1}{4}$ to $1\frac{1}{3}$ diameters from the end of snout, 2 to $2\frac{1}{2}$ apart. The dorsal profile more convex than that of the abdomen. The width of the mouth $3\frac{1}{3}$ in the length of the head, and in the adult about three times the depth of the cleft; snout slightly in advance of the jaws in the young, but hardly so in the adult, in which it is often covered with pores. Lips thin, continuous, the lower reflected from off the mandible, and with a shallow groove along its hind edge. No horny covering inside jaws. *Barbels*—a very short maxillary pair. *Teeth*—pharyngeal, plough-shaped or molariform, 5, 3, 2/2, 3, 5. *Fins*—the dorsal as high as the head is long, and with a concave upper edge; it commences slightly nearer the end of the snout than the base of the caudal fin. Pectoral about as long as the head and reaching the ventral, which is rather shorter. *Scales*—$5\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—varying with the age of the fish; generally silvery, darkest along the back, and with the lower fins stained orange; fine black dots on all the fins. In specimens about four inches long there are three or four small black spots on the fifth and sixth scales of the lateral line, which gradually and almost entirely fade as age advances.

Hab. From the Kistna and Godávari rivers through Orissa, Lower Bengal, and Assam. This fish (which attains nearly two feet in length) is extensively used for stocking tanks.

307. (18.) Labeo microphthalmus.

Labeo microphthalmus, *Day, Fish. India*, p. 542, pl. cxxxii, fig. 4 (see synon.)

B. iii. D. 13 (3/10). P. 18. V. 9. A. 7 (2/5). C. 19. L. l. 41–43. L. tr. 8/9.

Length of head 6 in the total length. *Eyes*—diameter $5\frac{1}{2}$ in length of head, 2 diameters from end of snout, and $2\frac{1}{4}$ apart. Dorsal profile more convex than that of the abdomen. Snout

overhanging the mouth, but not swollen, having a very indistinct lateral lobe; some specimens have a few small pores on the snout. Lips continuous; the groove across the lower jaw interrupted; mouth transverse, inferior; a cartilaginous or horny covering to inside of the lower jaw. The suborbital ring of bones comparatively wide, being two thirds the width of the orbit. *Barbels*—a short maxillary pair. *Teeth*—pharyngeal, plough-shaped, 5, 4, 2/2, 4, 5. *Fins*—the height of the dorsal equals or exceeds the length of the head, its upper edge is very concave, it arises midway between the end of the snout and the posterior extremity of the base of the anal fin. The pectoral does not reach the ventral. *Scales*—$6\frac{1}{2}$ rows between lateral line and base of ventral fin. The scales covering the thorax are very small. *Colour*—silvery, darkest in the upper half of the body; sometimes the scales are marked with red.

Hab. Himalayas, from the Punjab, Murree, and Kangra, also Kashmir.

308. (19.) Labeo boggut.

Chondrostoma boggut, *Sykes, Tr. Z. S.* ii, p. 359.
Labeo boggut, *Day, Fish. India*, p. 542, pl. cxxviii, fig. 4 (see synon.).

Sande and *Kolees*, Mahr.; *Loi*, Cutch.

B. iii. D. 11–12 (3/8–9). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 60–65. L. tr. 11–12/14.

Length of head $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ to $1\frac{3}{4}$ diameters from end of snout, and 2 apart. Dorsal profile rather more convex than that of the abdomen. Snout thick, somewhat projecting beyond the jaws, but without any lateral lobe. A few pores on the snout. Lower labial fold complete; lower lip fimbriated; a horny covering to the inside of the lower lip. *Barbels*—a short maxillary pair. *Fins*—the dorsal commences nearer to the snout than to the root of the caudal, it is as high as the body, its upper edge concave. The pectoral is nearly as long as the head and does not reach the ventral; the latter is inserted under the middle dorsal rays. The ventral does not extend to the anal, nor the latter to the caudal, which is deeply forked. *Scales*—8 or 9 rows between lateral line and base of ventral fin. *Colour*—silvery, darkest superiorly. Fins orange. In some specimens a few light lines run along the sides, or a bluish band along the body. A dark spot usually present near the base of the caudal, and sometimes a smaller one on the lateral line above the last third of the pectoral fin.

Hab. Bengal, the Punjab, Central Provinces, Bombay, the Deccan, common at Jubbulpore and in Cutch, also found at Madras. It attains at least $7\frac{1}{2}$ inches in length.

309. (20.) Labeo boga.

Cyprinus boga, *Ham. Buch. Fish. Ganges*, pp. 286, 386, pl. 28, fig. 80.
Labeo boga, *Day, Fish. India*, p. 543, pl. cxxviii, fig. 3, and pl. cxxxi, fig. 4 (see synon.).

Kinda-meen, and *Coal-arinza-candee*, Tam.; *Ariza*, Tel.; *Kala-battali*, Ooriah; *Bangum-batta*, Beng.; *Morah*, Punj.; *Kyouk-nya-loo*, Burm.

B. iii. D. 11–13 (2–3/9–10). P. 16. V. 9. A. 7 (2/5). C. 19.
L. l. 37–39. L. tr. $6\frac{1}{2}$–7/7. Vert. 17–15.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. *Eyes*—somewhat before the middle of the head, $3\frac{3}{4}$ to 4 diameters in length of head. Dorsal profile rather more convex than that of the abdomen. Mouth rather narrow, its width equalling one third of the length of the head. Snout projecting moderately beyond the jaws, no lateral lobe. Lips rather thick. A thin layer of cartilage to inner surface of lower lip. Snout occasionally covered with large pores. *Barbels*—a minute maxillary pair. *Teeth*—pharyngeal, 5, 4, 3/3, 4, 5, plough-shaped. *Fins*—origin of dorsal commences nearer the snout than the base of the caudal, upper margin concave; caudal deeply forked, lobes of equal length. *Scales*—5 rows between lateral line and base of ventral fin. *Colour*—orange, with the fins of a reddish tinge; sometimes a dark spot on the shoulder.

Hab. Rivers of Gangetic Provinces, Madras, and Burma; said to attain a foot in length. Pl. cxxviii, fig. 3, 'Fishes of India,' is from a Burmese specimen, and Pl. cxxxi, fig. 4, is from an example from the Jumna.

310. (21.) Labeo nukta.

Cyprinus nukta, *Sykes, Tr. Z. S.* ii, p. 355.
Labeo nukta, *Day, Fish. India*, p. 543, pl. cxxviii, fig. 5 (see synon.).

Nakta and *Nanktashendra*, Maráthi.

B. iii. D. 11 (2/9). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 37–38. L. tr. 6/9.

Length of head 5 to $6\frac{1}{4}$ in the total length. *Eyes*—diameter 6 in the length of the head, $2\frac{1}{2}$ diameters from the end of snout, and also apart. Snout projecting over the mouth, and having a deep groove passing from one orbit to the opposite one, thus presenting the appearance of a blunt compressed knob between and before the orbits. Mouth of moderate width; the snout with a well-developed lateral lobe and a distinct inner fold to the lips at the angle of the mouth, extending across the outer third of the lower jaw, from which the lip is reflected and studded with pores, but neither lip is fringed. Both lips with a thin deciduous horny layer internally. Some large pores on snout, on forehead, and in the rostral groove. *Barbels*—a rudimentary maxillary pair. *Lateral line*—badly marked, $4\frac{1}{2}$ rows of scales between it and the base of the ventral fin. *Fins*—dorsal arises midway between the snout and the posterior extremity of the base of the anal fin, its anterior three rays are much elevated and higher than the body, the last besides being divided to its root is also somewhat prolonged, making the upper margin of the fin concave; the ventral arises under the middle of the dorsal and scarcely reaches the anal, which fin is much higher anteriorly.

Pectoral as long as the head. Caudal deeply forked. A row of scales along the base of the dorsal. *Colour*—silvery, with some red marks on the scales. Fins reddish, caudal edged with grey.

Hab. Poona and rivers of the Deccan; attaining at least 12 inches in length.

311. (22.) **Labeo nigripinnis.**

Labeo nigripinnis, *Day, Fish. India*, p. 544, pl. cxxxii, fig. 3.

B. iii. D. 11 (2/9). P. 17. V. 9. A. 7 (2/5). C. 19.
L. l. 40–42. L. tr. 8/8.

Length of head 5 to 5¼ in the total length. *Eyes*—situated in the middle of the length of the head in the young, rather before it in the adult, diameter 4⅓ in the length of the head. Dorsal profile somewhat elevated, abdominal nearly straight. Snout projecting over the mouth, which is inferior, and the width of which equals one third of the length of the head; the lips continuous at the angle of the mouth; the lower lip thin and reflected from off the mandible, which has a thin cartilaginous covering. Large pores on the snout, which in some specimens has a groove across it. *Barbels*—a minute maxillary pair. *Fins*—dorsal commences midway between the end of the snout and the posterior extremity of the base of the anal fin; it is as high as the body and has a concave upper edge. Pectoral as long as the head excluding the snout, or even a little more. Ventral commences below the first third of the dorsal. Caudal deeply forked. *Scales*—from 5 to 5½ rows between the lateral line and base of ventral fin. *Colour*—bluish along the back, becoming dull white on the sides and beneath. In some specimens the bases of the scales are dark coloured, some have a dull band along the side. Fins black in the adult, not always so in the young.

Hab. Sind hills and rivers at their bases.

312. (23.) **Labeo sindensis.**

Cirrhina sindensis, *Day, J. A. S. B.* xli, pt. 2, 1872, p. 319.
Labeo sindensis, *Day, Fish. India*, p. 544, pl. cxxxii, fig. 2.

B. iii. D. 12–13 (2–3/10). P. 18. V. 9. A. 7 (2/5). C. 19.
L. l. 43. L. tr. 8/9.

Length of head 6¼ in the total length. *Eyes*—rather nearer to snout than to hind edge of opercles, diameter 5½ in the length of the head, 2 diameters from the end of snout, and 2½ apart. Dorsal profile rather more convex than that of the abdomen. Snout rather overhanging the mouth. No lateral lobe to snout, which in some specimens has a deep groove across it, and is covered with glands. Lips continuous at the angle of the mouth; the lower lip thin with a smooth edge, and reflected from off the mandible, which has a thin cartilaginous covering. *Barbels*—a short maxillary pair. *Fins*—dorsal commences midway between the end of the snout and the posterior extremity of the base of the anal, it is rather higher

than the body, its upper edge concave. Pectoral as long as the head excluding the snout. Ventral inserted under the middle of the dorsal fin. Caudal deeply forked. *Scales*—6½ to 7 rows between the lateral line and the base of the ventral fin. *Colour*—silvery, with a reddish tinge, the bases of the scales darkest; fins reddish.

Hab. Sind, the Punjab (at Lahore and Hardwar), also the Deccan at Poona. This species attains at least 8 inches in length.

313. (24.) Labeo ariza.

Cyprinus ariza, *Buchanan, Journey Mysore*, iii, p. 344, pl. 31.
Labeo ariza, *Day, Fish. India*, p. 544, pl. cxxxii, fig. 5 (see synon.).

Kavdasha, Maráthi; and *Coal*, Tamil.

B. iii. D. 11 (2/9). P. 18. V. 9. A. 7–8 (2–3/5). C. 19.
L. l. 38. L. tr. 6–7/8.

Length of head 5¼ to 5½ in the total length. *Eyes*—rather nearer snout than hind edge of opercle, diameter 5½ in the length of the head, 2 diameters from the end of snout, and 2½ apart. Dorsal profile slightly more convex than that of the abdomen. The width of the mouth equals one third of the length of the head. Lips smooth, with a thin cartilaginous covering inside the lower jaw. A few pores on snout. *Barbels*—a very short maxillary pair. *Fins*—dorsal commences slightly nearer the snout than the base of the caudal fin, it is three fourths as high as the body, and has a concave upper margin. Pectoral nearly as long as the head. Ventral inserted below anterior third of dorsal fin, and not so long as the pectoral. Caudal deeply forked. *Scales*—5½ rows between the lateral line and base of ventral fin. *Colour*—leaden grey above, becoming silvery on the sides and beneath.

Hab. Wynaad, the Bhaváni river at the foot of the Nilgiri hills in Madras, and the Cauvery river. This fish attains to about 9½ inches in length.

314. (25.) Labeo kawrus.

Chondrostoma kawrus, *Sykes, Tr. Z. S.* ii, p. 358, pl. lxii, fig. 2.
Labeo kawrus, *Day, Fish. India*, p. 545, pl. cxxxi, fig. 5 (see synon.).

B. iii. D. 11 (2/9). P. 17. V. 9. A. 7 (2/5). C. 19.
L. l. 38. L. tr. 6/6.

Length of head 5½ to 6 in the total length. *Eyes*—diameter 3½ to 3¾ in the length of the head, 1 diameter from the end of snout, and 1½ apart. Dorsal and abdominal profiles about equally convex. Snout very obtuse and not overhanging the jaws. Lips continuous at the angle of the mouth, the lower one very thin and reflected off the mandible, which is rounded and has a thin cartilaginous covering; edges of lips smooth. *Barbels*—a minute maxillary pair. *Teeth*—pharyngeal, plough-shaped, 5, 4, 3/3, 4, 5. *Fins*—dorsal commences midway between end of snout and posterior extremity of base of anal fin; it is rather higher than the head is long, its upper edge is

concave. Pectoral nearly as long as the head. Caudal deeply forked. *Scales*—4½ rows between lateral line and base of ventral fin. *Colour*—silvery, dorsal and caudal fins externally stained with grey; sometimes a dark blotch on the scales near the commencement of the lateral line.

Hab. Poona and the Deccan.

10. Genus **OSTEOCHILUS**, Günther.

Syn. *Rohita*, sp., Cuv. & Val.

Abdomen rounded. Mouth of moderate width, directed more or less downwards; lips thickened, continuous, fringed or crenulated, the lower being reflected from off the mandible, leaving it uncovered in the form of a sharp and hard, transverse, prominence. No tubercle at symphysis. Snout obtusely rounded. Barbels four or two. Pharyngeal teeth usually 5, 4, 2/2, 4, 5. Dorsal fin without osseous ray, with a moderate number of branched rays (10 to about 20), commencing in advance of the ventrals. Anal with few rays. Scales of moderate or small size; no tile-like row at base of anal fin. Lateral line passing to the centre of the base of the caudal fin. Gill-rakers short.

Geographical Distribution. Burma and the Malay Archipelago.

Synopsis of Indian Species.

D. 2/18, A. 3/5, L. l. 54. Four barbels. Colours uniform	1. *O. chalybeatus*, p. 273.
D. 2-3/15–16, A. 2/5, L. l. 34. Four barbels. A darkish band near commencement of lateral line, and a dark mark before base of caudal fin	2. *O. neilli*, p. 274.
D. 3/13, A. 3/6, L. l. 40. Two barbels. Colours uniform	3. *O. cephalus*, p. 275.

315. (1.) **Osteochilus chalybeatus.**

Rohita chalybeata, *Cuv. & Val. H. N. Poiss.* xvi, p. 271.
Osteochilus chalybeatus, *Day, Fish. India*, p. 545, pl. cxxix, fig. 1 (see synon.).

Nga-leh, Burmese.

B. iii. D. 20 (2/18). P. 18. V. 9. A. 7 (2/5). C. 19.
L. l. 54. L. tr. 8/10.

Length of head 5, height of body 4¼ in total length. *Eyes*—diameter 4 in length of head, 1¼ diameters from end of snout, and 2 apart. Snout overhanging the jaws and without any lateral lobe. Mouth rather narrow, its width being about one third of length of head. Lips thick and fringed, with an inner fold above and below. *Barbels*—the maxillary pair half as long as the orbit, the rostral shorter. *Fins*—the dorsal commences midway between

the end of the snout and the posterior margin of the base of the anal fin, its upper edge is straight. Pectoral rather longer than the head excluding the snout; it does not reach the ventral, nor the latter the anal. Anal laid flat just reaches the caudal, which is moderately forked. *Scales*—six rows between the lateral line and base of the ventral fin. *Colour*—grey, becoming lighter below, narrow dark lines along the body; fins black.

Hab. Irrawaddy and Salween rivers in Burma.

316. (2.) **Osteochilus neilli.** (Fig. 94.)

Labeo neilli, *Day, P. Z. S.* 1870, p. 99.
Osteochilus neilli, *Day, Fish. India*, p. 545, pl. cxxx, fig. 2.

B. iii. D. 17–18 (2–3/15–16). P. 15. V. 9. A. 7 (2/5). C. 19. L. l. 34. L. tr. $5\frac{1}{2}/6\frac{1}{2}$.

Length of head $5\frac{1}{2}$, height of body $3\frac{1}{2}$ in total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diameters from end of snout, and 2 apart. Snout rounded and smooth, it scarcely overlaps the mouth, which is of moderate width; no lateral lobe. Both lips fringed with two, three, or more rows of well-developed papillæ internally; groove across the mandible not complete; a cartila-

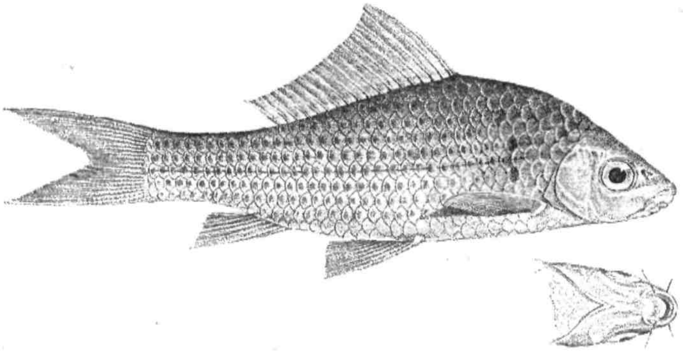

Fig. 94.—*Osteochilus neilli.*

ginous covering internally to the lower jaw. *Barbels*—the rostral do not reach the orbit, the maxillary extend to beneath its centre. *Teeth*—pharyngeal, plough-shaped, 5, 4, 3/3, 4, 5. *Fins*—the dorsal commences before the ventral, and much nearer to the snout than to the base of the caudal, its upper border is somewhat concave; caudal deeply forked. *Scales*—4 rows between lateral line and base of ventral fin. *Colour*—greyish yellow, deepest superiorly, every scale being darkest at its base. A dull spot near the root of the caudal fin, and another ill-defined one near the commencement of the lateral line. Fins yellowish orange, dorsal darkest at its basal half.

Hab. Sittoung, Billing, and Rangoon in Burma. The largest specimen, out of seven, measured six inches in length.

317. (3.) Osteochilus cephalus.

Labeo cephalus, *Cuv. & Val. H. N. Poiss.* xvi, p. 347, pl. 487.
Osteochilus cephalus, *Day, Fish. India*, p. 546.

B. iii. D. 16 (3/13). P. 20. V. 9. A. 9 (3/6). C. 19.
L. l. 40. L. tr. 7/7.

Length of head $4\frac{1}{2}$, height of body 4 in the total length. *Eyes*—one fifth of length of head, two diameters from end of snout. The snout projects beyond the jaws, it is rather swollen and has many pores opening on its surface; the mandible has a transverse free edge, with thick lip, both the upper and lower lips fringed. *Barbels*—one short maxillary pair. *Fins*—the dorsal commences midway between the snout and base of caudal, and in advance of the ventrals, its upper border is concave. The anal laid flat reaches the caudal. *Scales*—$4\frac{1}{2}$ rows between the lateral line and base of ventral fin. *Colour*—greenish, with the base of each scale darkest.

Hab. Pegu, attaining one foot in length.

11. Genus DANGILA, Cuvier & Valenciennes.

Syn. *Cyrene*, sp., Heckel.

Abdomen rounded. Snout moderately depressed and obtusely rounded. Mouth transverse, more or less inferior. Lower jaw sharp, covered with a thin lip, and having a tubercle above the symphysis; upper lip fringed. Barbels small, one maxillary and one mandibular pair. Pharyngeal teeth, 5, 4 or 3, 3 or 2/2 or 3, 3 or 4, 5. Dorsal fin rather long, without any osseous ray, and commencing in advance of the ventrals. Anal short, without a tile-like row of scales. Scales of large, small, or moderate size. Lateral line continuous, passing to the centre of the base of the caudal fin. Gill-rakers short.

This genus, which differs from *Cirrhina* in possessing a few more rays in the dorsal fin, does not appear to extend into India proper.

Geographical Distribution. Burma to the Malay Archipelago.

Synopsis of Indian Species.

D. 26–38, L. l. 39–40, L. tr. 7/9 .... 1. *D. burmanica*, p. 275.
D. 26, L. l. 31, L. tr. 6/? .... 2. *D. berdmorei*, p. 276.

318. (1.) Dangila burmanica. (Fig. 95.)

Dangila burmanica, *Day, Fish. India*, p. 546, pl. cxxxi, fig. 2 (see synon.).

B. iii. D. 26–28 (2–3/24–25). P. 16. V. 9. A. 7 (2/5).
C. 19. L. l. 39–40. L. tr. 7/9.

Length of head 7, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter 3 in length of head, 1 diameter from end of snout, and $1\frac{1}{4}$ apart. Mouth transverse, with the snout slightly depressed and rounded; upper lip fringed; a small tubercle inside the lower jaw above the symphysis. *Barbels*—the maxillary pair as long as

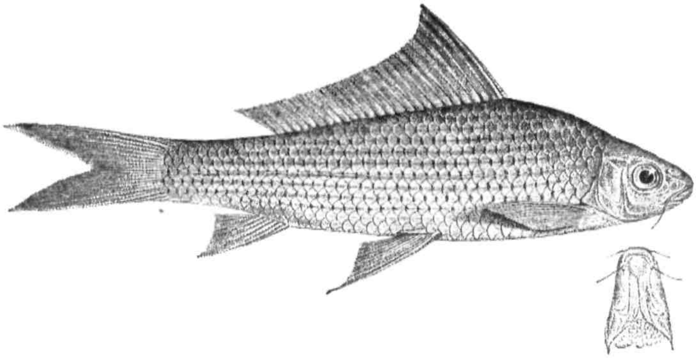

Fig. 95.—*Dangila burmanica.*

the eye, the rostral pair shorter. *Teeth*—pharyngeal, 5, 4, 3/3, 4, 5. *Fins*—dorsal commences above the ninth scale of the lateral line, its upper edge concave, and its highest rays four fifths of the height of the body. Pectoral nearly as long as the head, not reaching the ventral. Upper caudal lobe the longer. *Scales*—five rows between lateral line and base of ventral fin. *Colour*—silvery, some of the scales with dark spots at their bases forming rows or horizontal bands. Fins orange, the edges of the caudal stained.

Hab. Moulmein and Tavoy (where it does not seem to be uncommon); several specimens obtained measured up to 10 inches in length.

319. (2.) **Dangila berdmorei.**

Dangila berdmorei, *Blyth, J. A. S. B.* xxix, 1860, p. 162; *Day, Fish. India*, p. 546.

B. iii. D. 26 (3/23). V. 9. A. 7 (2/5). L. l. 31. L. tr. 6/?

Length of head 5, height of body 4 in the total length. *Eyes*—diameter two fifths of length of head, three fourths of a diameter from end of snout. Pores on front of snout large. A distinct tubercle above symphysis. Lower lip rather thick, not fringed. *Barbels*—rostral equal to the length of the orbit. *Fins*—dorsal arises in commencement of second third of total length; the pectoral does not quite reach the ventral. Caudal deeply forked. *Scales*—$3\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—uniform in spirit. According to Blyth's description each scale is tipped by a black spot.

Hab. Tenasserim Provinces of British Burma.

12. Genus **CIRRHINA**, Cuvier.

Syn. *Bangana*, pt., Ham. Buch.; *Dangila*, sp., Cuv. & Val.; *Cyrene*, sp., Heckel; *Mrigala*, sp., Bleeker; *Crossochilus*, pt., Günther.

Abdomen rounded. Snout depressed and obtusely rounded, with the soft coverings extremely thin. Mouth broad, transverse. Upper lip fringed or entire, and not continuous with the lower lip. Lower jaw rather sharp, without any lip or with a thin one, generally destitute of any horny covering, but having a small tubercle above the mandibular symphysis. Barbels small, four, two, or none. Dorsal fin rather short or of moderate length, without any osseous ray, and commencing in advance of the ventrals. Anal fin short, without a row of tile-like scales. Scales of large, small, or moderate size. Lateral line continuous, passing to the centre of the base of the caudal fin. Gill-rakers short.

Geographical Distribution. Fresh waters of Baluchistan, Sind, India, generally throughout Burma, and the East Indian Archipelago.

Synopsis of Indian Species.

D. 17–19, L. l. 42–44. Four barbels. Upper lip entire	1. *C. cirrhosa*, p. 277.
D. 15–16, L. l. 40–45. Two barbels. Upper lip entire	2. *C. mrigala*, p. 278.
D. 10–11, L. l. 38–40. Four barbels. Upper lip fringed	3. *C. latia*, p. 279.
D. 10–11, L. l. 35–38. One pair of short rostral barbels. Upper lip indistinctly fringed or entire	4. *C. reba*, p. 279.
D. 10, L. l. 48. Two barbels	5. *C. fulungee*, p. 280.

320. (1.) **Cirrhina cirrhosa.**

Cyprinus cirrhosus, *Bloch, Ich.* xii, p. 52, t. 411; *Bloch Schn. Syst. Ich.* p. 450.
Cirrhina cirrhosa, *Day, Fish. India*, p. 547, pl. cxxxi, fig. 3 (see synon.).

Ven-candi, Tam.; *Aruzu*, Tel.

B. iii. D. 17–19 (3–4/14–15). P. 19. V. 9. A. 8 (3/5).
C. 19. L. l. 42–44. L. tr. 8/9. Vert. 21/17.

Length of head $5\frac{1}{2}$ to 6, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of the head, 1 diameter from end of snout, and $1\frac{1}{2}$ apart. Dorsal profile more convex than that of the abdomen. Width of mouth equals one third of the

length of the head. Usually some fine pores on the snout, which does not project beyond the jaws. *Barbels*—the maxillary are about one third as long as the eye, the rostral pair are rather longer. *Teeth*—pharyngeal, plough-shaped and with the sides of the outer ones roughened, 5, 4, 3/3, 4, 5. *Fins*—the dorsal as high as the body, it arises considerably in advance of the ventrals, and midway between the snout and the posterior portion of the base of the anal fin, its upper margin concave; in some large specimens the first few rays are very elongated. Caudal deeply forked or lunated. *Scales*—$5\frac{1}{2}$ to $6\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—silvery, every scale having a red centre, except along the abdomen, where they are of a dull yellowish white. Dorsal and caudal stained with grey, also the outer end of the anal and pectoral.

Hab. Godávari, Kistna, and Cauvery rivers, and generally in Southern India. Grows to $1\frac{1}{2}$ feet in length. Is a very active fish and fair eating but bony.

321. (2.) Cirrhina mrigala.

Cyprinus mrigala, *Ham. Buch. Fish. Ganges*, pp. 279, 386, pl. 6, fig. 79.
Cirrhina mrigala, *Day, Fish. India*, p. 347, pl. cxxix, fig. 4 (see synon.).

Mirrgah, Ooriah; *Mrigala*, Beng. and Hind.; *Naim*, Hind. (N. W. P.); *Nga-kyin* and *Nga-gyein*, Burm.; *Mor-ah-kee*, Sind and Cutch.

B. iii. D. 15–16 (3/12–13). P. 15. V. 9. A. 8 (3/5). C. 15. L. l. 40–45. L. tr. $6\frac{1}{2}$–$7/8\frac{1}{2}$.

Length of head 5 to $5\frac{1}{4}$, height of body 4 to $5\frac{1}{2}$ in the total length. *Eyes*—in the anterior half of the head, diameter $3\frac{1}{2}$ to 4 in the length of the head, 1 to $1\frac{1}{4}$ diameters from the end of snout, and 2 apart. Width of the mouth equals two fifths of the length of the head. Pores present or absent on the snout. *Teeth*—pharyngeal, plough-shaped, 5, 4, 2/2, 4, 5. *Fins*—dorsal nearly as high as the body, it arises rather nearer to the snout than to the base of the caudal fin, and opposite the twelfth scale of the lateral line; upper margin of fin slightly concave, in Sind examples deeply so. Pectoral as long as the head excluding the snout, not reaching the ventral. Caudal with sharp and deeply forked lobes, which have convex edges internally. *Scales*—$5\frac{1}{2}$ to 6 rows between lateral line and base of ventral. *Colour*—silvery, dark grey along the back, sometimes having a coppery tinge; the pectoral, ventral, and anal orange stained with black. Eyes golden.

Hab. Rivers and tanks in Bengal, Deccan, N.W. Provinces, Punjab, Sind, Cutch, and Burma, growing to 3 feet in length. It is an excellent species for stocking tanks with. I have taken it in Rangoon 18 pounds in weight.

322. (3.) Cirrhina latia.

Cyprinus latius, *Ham. Buch. Fish. Ganges*, pp. 345, 393.
Cirrhina latia, *Day, Fish. India*, p. 548, pl. cxxx, fig. 4 (see synon.).

Kala-batta, Bengali and Ooriah; *Behrah* and *Tellarree*, Punj.; *Curru*, Sind.

B. iii. D. 10–11 (3/7–8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 38–40. L. tr. 6/6. Vert. 15/17.

Length of head 6 to $6\frac{1}{2}$, height of body $5\frac{1}{2}$ to 7 in the total length. *Eyes*—rather behind the middle of the head in the adult; diameter $3\frac{1}{2}$ to 5 in the length of the head, about 2 diameters from end of snout, and also apart. Upper surface of the head rather broad; snout overhanging the jaws and having a small lateral lobe. Upper lip deeply indented on the edge, and each indentation (in some specimens) having a tricuspid termination; this is most seen in examples from Calcutta and Orissa, least so in those from Sind, the Punjab, and Central Provinces; the surface rough as in *Discognathus*. Lower lip with a strong sharp horny covering, the lip at the angle having a sort of pendulous lobe; the under surface of the jaw with a round, callous, and rather elevated spot, which in the adult has a free anterior edge. *Barbels*—a rostral pair and sometimes a short maxillary pair. *Teeth*—pharyngeal, crooked, 5, 4, 2/2, 4, 5. *Fins*—dorsal commences about midway between the end of the snout and base of the caudal fin in the young, but rather nearer the snout in the adult. Pectoral as long as the head, its outer three or four rays rather thickened. Caudal deeply forked, upper lobe sometimes the longer. *Scales*—$3\frac{1}{2}$ to $4\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—brownish olive, irregularly spotted with black marks. Dorsal and caudal fins yellowish, stained with grey, the others orange..

This fish has much the character of a loach or of a *Discognathus*, adhering to stones in the beds of rivers.

Hab. Sind, Orissa, Bengal, N.W. Provinces, Punjab, Deccan, and along the Himalayas; attaining 8 inches in length.

323. (4.) Cirrhina reba. (Fig. 96.)

Cyprinus reba, *Ham. Buch. Fish. Ganges*, pp. 280, 386.
Cirrhina reba, *Day, Fish. India*, p. 549, pl. cxxx, fig. 3 (see synon.).

Eelemose and *Chittahri*, Tel.; *Pil aringam*, Tamil; *Chetchua-porah*, Ooriah; *Batta*, Bengali; *Rewah*, Hind.; *Soonnee*, Punj. and Sind; *Lasseem*, Assam.

B. iii. D. 10–11 (2–3/8–9). P. 16. V. 9. A. 8 (3/5). C. 19.
L. l. 35–38. L. tr. 7/9.

Length of head 6 to $6\frac{1}{4}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in the length of head, 1 to $1\frac{1}{2}$ diameters from the end of snout, and nearly 2 apart. Snout slightly projecting, more distinctly in the immature. Upper lip fringed in the young, sometimes entire in the adult. A thin cartilaginous layer

covering inside of lower jaw. Pores on snout present or absent. *Barbels*—a short rostral pair, which may be absent; none on the maxilla. *Teeth*—pharyngeal, 5, 4, 1/1, 4, 5. *Fins*—dorsal commences anteriorly to the ventral, upper margin of the fin concave. Pectoral nearly as long as head. Caudal with deep, sharp lobes.

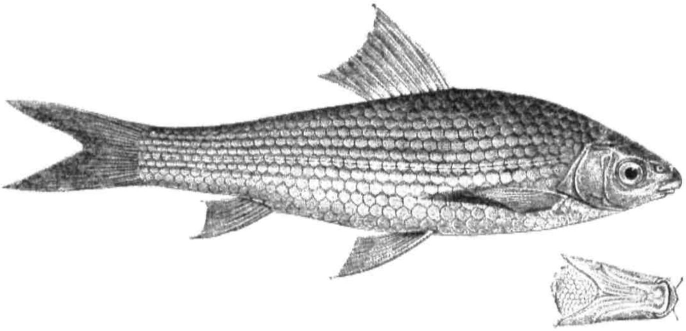

Fig. 96.—*Cirrhina reba.*

Scales—hexagonal; five or six rows between lateral line and base of ventral fin. *Colour*—silvery, scales generally darkest at their edges, forming bluish longitudinal bands above the lateral line. The young have sometimes a leaden-coloured band along the side, or even a black tip to the dorsal fin.

Hab. Throughout India, attaining a foot in length.

324. (5.) Cirrhina fulungee.

Chondrostoma fulungee, *Sykes, Tr. Z. S.* ii, p. 358.
Cirrhina fulungee, *Day, Fish. India*, p. 549, pl. cxxxii, fig. 1 (see synon.), also *Supplement*, p. 807.

B. iii. D. 10 (2/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 44–48. L. tr. 8/9.

Length of head $5\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in the length of head, two thirds of a diameter from the end of snout, and 1 to $1\frac{1}{2}$ apart. Snout slightly overhanging the mouth. The upper lip scarcely fimbriated, the two lips not continuous; the lower is reflected from off the mandible, which is transverse, sharp, having a tubercle above the symphysis, but no cartilaginous covering. *Barbels*—a very short rostral pair; none on the maxilla. *Fins*—the dorsal nearly as high as the body, its upper edge concave, it commences midway between the end of the snout and the posterior end of the base of the anal fin. Pectoral almost as long as the head, ventral of equal length. Caudal deeply forked. *Scales*—$6\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—brownish along the back, divided by a light bluish band from a silvery abdomen; dorsal and caudal stained with grey.

Hab. Poona and the Deccan.

13. Genus SEMIPLOTUS, Bleeker.

Abdomen rounded. Snout thick and prominent. Mouth wide, transverse, inferior, with a knob at the symphysis. No barbels. Pharyngeal teeth plough-shaped, 4, 3, 2/2, 3, 4. Dorsal fin long, its last undivided ray strong, osseous, and either serrated or entire. Anal rather short. Scales large; no tile-like row at the base of the anal fin. Lateral line passing to the centre of the base of the caudal fin. Gill-rakers short.

Geographical Distribution. Assam and Chittagong Hill-ranges, as well as Burma.

Synopsis of Indian Species.

D. 24, A. 9–10, L. l. 32–34. Last undivided dorsal ray serrated .... 1. *S. modestus*, p. 281.
D. 27–28, A. 9, L. l. 27. Last undivided dorsal ray entire.......................... 2. *S. macclellandi*, p. 281.

325. (1.) Semiplotus modestus.

Semiplotus modestus, *Day, P. Z. S.* 1870, p. 101; *and Fish. India*, p. 550, pl. cxxxiii, fig. 1.

B. iii. D. 24 (4/20). P. 15. V. 9. A. 9–10 (3/6–7). C. 19. L. l. 32–34. L. tr. $7\frac{1}{2}/7\frac{1}{2}$.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body nearly 3 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout, $1\frac{1}{2}$ diameters apart. Snout broad, obtuse, overhanging the mouth; several open pores on either side. Mouth inferior, transverse, a thin cartilaginous covering to the lower jaw. A small knob at the symphysis. The posterior extremity of the maxilla extends to beneath the middle of the orbit. *Barbels*—absent. *Fins*—dorsal commences anteriorly to the origin of the ventral, and extends to above the anal; its last undivided ray is osseous, serrated, and as long as the head excluding the snout. The pectoral reaches the ventral and the latter the anal. Caudal forked. *Scales*—$3\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—silvery, darkest in the upper half of the body. Ventrals and anal tipped with orange.

Hab. Hill-ranges near Akyab; two specimens obtained, up to $5\frac{1}{2}$ inches in length.

326. (2.) Semiplotus macclellandi. (Fig. 97.)

Cyprinus semiplotus, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 274, 346, pl. xxxvii, fig. 2.
Semiplotus macclellandi, *Bleeker, Atl. Ich.* iii, *Cyp.* p. 25; *Day, Fish. India*, p. 550, pl. cxxxiii, fig. 4 (see synon.).

Sundaree, Sentoree, and *Lah-bo-e,* Assam.

B. iii. D. 27–28 (3/24–25). P. 16. V. 10. A. 9 (2/7). C. 19. L. l. 27–33. L. tr. 6/6.

covering inside of lower jaw. Pores on snout present or absent. *Barbels*—a short rostral pair, which may be absent; none on the maxilla. *Teeth*—pharyngeal, 5, 4, 1/1, 4, 5. *Fins*—dorsal commences anteriorly to the ventral, upper margin of the fin concave. Pectoral nearly as long as head. Caudal with deep, sharp lobes.

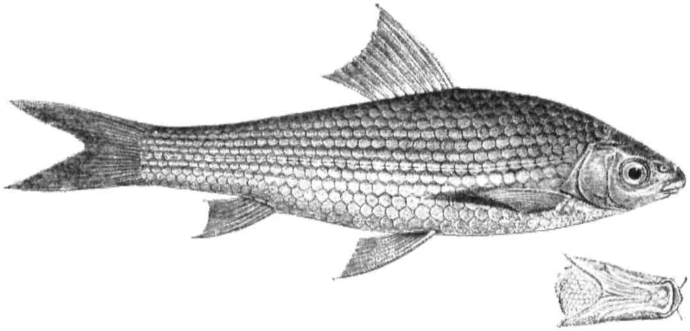

Fig. 96.—*Cirrhina reba.*

Scales—hexagonal; five or six rows between lateral line and base of ventral fin. *Colour*—silvery, scales generally darkest at their edges, forming bluish longitudinal bands above the lateral line. The young have sometimes a leaden-coloured band along the side, or even a black tip to the dorsal fin.

Hab. Throughout India, attaining a foot in length.

324. (5.) Cirrhina fulungee.

Chondrostoma fulungee, *Sykes, Tr. Z. S.* ii, p. 358.
Cirrhina fulungee, *Day, Fish. India,* p. 549, pl. cxxxii, fig. 1 (see synon.), also *Supplement,* p. 807.

B. iii. D. 10 (2/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 44–48. L. tr. 8/9.

Length of head $5\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in the length of head, two thirds of a diameter from the end of snout, and 1 to $1\frac{1}{2}$ apart. Snout slightly overhanging the mouth. The upper lip scarcely fimbriated, the two lips not continuous; the lower is reflected from off the mandible, which is transverse, sharp, having a tubercle above the symphysis, but no cartilaginous covering. *Barbels*—a very short rostral pair; none on the maxilla. *Fins*—the dorsal nearly as high as the body, its upper edge concave, it commences midway between the end of the snout and the posterior end of the base of the anal fin. Pectoral almost as long as the head, ventral of equal length. Caudal deeply forked. *Scales*—$6\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—brownish along the back, divided by a light bluish band from a silvery abdomen; dorsal and caudal stained with grey.

Hab. Poona and the Deccan.

13. Genus **SEMIPLOTUS**, Bleeker.

Abdomen rounded. Snout thick and prominent. Mouth wide, transverse, inferior, with a knob at the symphysis. No barbels. Pharyngeal teeth plough-shaped, 4, 3, 2/2, 3, 4. Dorsal fin long, its last undivided ray strong, osseous, and either serrated or entire. Anal rather short. Scales large; no tile-like row at the base of the anal fin. Lateral line passing to the centre of the base of the caudal fin. Gill-rakers short.

Geographical Distribution. Assam and Chittagong Hill-ranges, as well as Burma.

Synopsis of Indian Species.

D. 24, A. 9-10, L. l. 32-34. Last undivided dorsal ray serrated .... 1. *S. modestus*, p. 281.
D. 27-28, A. 9, L. l. 27. Last undivided dorsal ray entire.......................... 2. *S. macclellandi*, p. 281.

325. (1.) **Semiplotus modestus.**

Semiplotus modestus, *Day, P. Z. S.* 1870, p. 101; *and Fish. India*, p. 550, pl. cxxxiii, fig. 1.

B. iii. D. 24 (4/20). P. 15. V. 9. A. 9-10 (3/6-7). C. 19. L. l. 32-34. L. tr. $7\frac{1}{2}/7\frac{1}{2}$.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body nearly 3 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout, $1\frac{1}{2}$ diameters apart. Snout broad, obtuse, overhanging the mouth; several open pores on either side. Mouth inferior, transverse, a thin cartilaginous covering to the lower jaw. A small knob at the symphysis. The posterior extremity of the maxilla extends to beneath the middle of the orbit. *Barbels*—absent. *Fins*—dorsal commences anteriorly to the origin of the ventral, and extends to above the anal; its last undivided ray is osseous, serrated, and as long as the head excluding the snout. The pectoral reaches the ventral and the latter the anal. Caudal forked. *Scales*—$3\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—silvery, darkest in the upper half of the body. Ventrals and anal tipped with orange.

Hab. Hill-ranges near Akyab; two specimens obtained, up to $5\frac{1}{2}$ inches in length.

326. (2.) **Semiplotus macclellandi.** (Fig. 97.)

Cyprinus semiplotus, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 274, 346, pl. xxxvii, fig. 2.
Semiplotus macclellandi, *Bleeker, Atl. Ich.* iii, *Cyp.* p. 25; *Day, Fish. India*, p. 550, pl. cxxxiii, fig. 4 (see synon.).

Sundaree, Sentoree, and *Lah-bo-e*, Assam.

B. iii. D. 27-28 (3/24-25). P. 16. V. 10. A. 9 (2/7). C. 19. L. l. 27-33. L. tr. 6/6.

covering inside of lower jaw. Pores on snout present or absent. *Barbels*—a short rostral pair, which may be absent: none on the maxilla. *Teeth*—pharyngeal, 5, 4, 1/1, 4, 5. *Fins*—dorsal commences anteriorly to the ventral, upper margin of the fin concave. Pectoral nearly as long as head. Caudal with deep, sharp lobes.

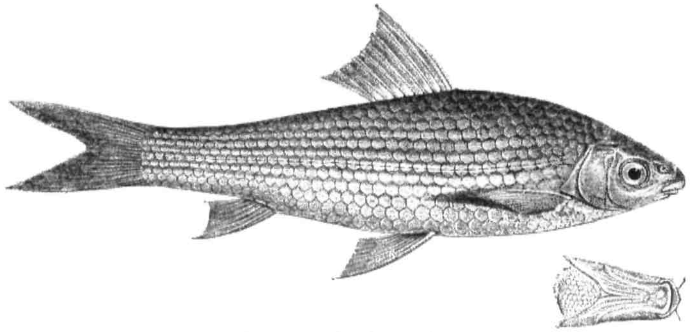

Fig. 96.—*Cirrhina reba.*

Scales—hexagonal; five or six rows between lateral line and base of ventral fin. *Colour*—silvery, scales generally darkest at their edges, forming bluish longitudinal bands above the lateral line. The young have sometimes a leaden-coloured band along the side, or even a black tip to the dorsal fin.

Hab. Throughout India, attaining a foot in length.

324. (5.) Cirrhina fulungee.

Chondrostoma fulungee, *Sykes, Tr. Z. S.* ii, p. 358.
Cirrhina fulungee, *Day, Fish. India*, p. 549, pl. cxxxii, fig. 1 (see synon.), also *Supplement*, p. 807.

B. iii. D. 10 (2/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 44–48. L. tr. 8/9.

Length of head $5\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in the length of head, two thirds of a diameter from the end of snout, and 1 to $1\frac{1}{2}$ apart. Snout slightly overhanging the mouth. The upper lip scarcely fimbriated, the two lips not continuous; the lower is reflected from off the mandible, which is transverse, sharp, having a tubercle above the symphysis, but no cartilaginous covering. *Barbels*—a very short rostral pair; none on the maxilla. *Fins*—the dorsal nearly as high as the body, its upper edge concave, it commences midway between the end of the snout and the posterior end of the base of the anal fin. Pectoral almost as long as the head, ventral of equal length. Caudal deeply forked. *Scales*—$6\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—brownish along the back, divided by a light bluish band from a silvery abdomen; dorsal and caudal stained with grey.

Hab. Poona and the Deccan.

13. Genus **SEMIPLOTUS**, Bleeker.

Abdomen rounded. Snout thick and prominent. Mouth wide, transverse, inferior, with a knob at the symphysis. No barbels. Pharyngeal teeth plough-shaped, 4, 3, 2/2, 3, 4. Dorsal fin long, its last undivided ray strong, osseous, and either serrated or entire. Anal rather short. Scales large; no tile-like row at the base of the anal fin. Lateral line passing to the centre of the base of the caudal fin. Gill-rakers short.

Geographical Distribution. Assam and Chittagong Hill-ranges, as well as Burma.

Synopsis of Indian Species.

D. 24, A. 9–10, L. l. 32–34. Last undivided dorsal ray serrated .... 1. *S. modestus*, p. 281.
D. 27–28, A. 9, L. l. 27. Last undivided dorsal ray entire.......................... 2. *S. macclellandi*, p. 281.

325. (1.) Semiplotus modestus.

Semiplotus modestus, *Day, P. Z. S.* 1870, p. 101; *and Fish. India*, p. 550, pl. cxxxiii, fig. 1.

B. iii. D. 24 (4/20). P. 15. V. 9. A. 9–10 (3/6–7). C. 19. L. l. 32–34. L. tr. $7\frac{1}{2}/7\frac{1}{2}$.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body nearly 3 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout, $1\frac{1}{2}$ diameters apart. Snout broad, obtuse, overhanging the mouth; several open pores on either side. Mouth inferior, transverse, a thin cartilaginous covering to the lower jaw. A small knob at the symphysis. The posterior extremity of the maxilla extends to beneath the middle of the orbit. *Barbels*—absent. *Fins*—dorsal commences anteriorly to the origin of the ventral, and extends to above the anal; its last undivided ray is osseous, serrated, and as long as the head excluding the snout. The pectoral reaches the ventral and the latter the anal. Caudal forked. *Scales*—$3\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—silvery, darkest in the upper half of the body. Ventrals and anal tipped with orange.

Hab. Hill-ranges near Akyab; two specimens obtained, up to $5\frac{1}{2}$ inches in length.

326. (2.) Semiplotus macclellandi. (Fig. 97.)

Cyprinus semiplotus, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 274, 346, pl. xxxvii, fig. 2.
Semiplotus macclellandi, *Bleeker, Atl. Ich.* iii, *Cyp.* p. 25; *Day, Fish. India*, p. 550, pl. cxxxiii, fig. 4 (see synon.).

Sundaree, Sentoree, and *Lah-bo-e*, Assam.

B. iii. D. 27–28 (3/24–25). P. 16. V. 10. A. 9 (2/7). C. 19. L. l. 27–33. L. tr. 6/6.

Length of head $5\frac{1}{2}$ to 6, height of body $3\frac{1}{2}$ in the total length. *Eyes*—in the middle of the length of the head, diameter from 4 to 6 in the length of head, the width of the interorbital space equalling rather above half the length of the head. Snout obtuse and thickened, with a row of about 6 open pores passing across it and towards the orbit. A horny covering to lower jaw. *Barbels*—

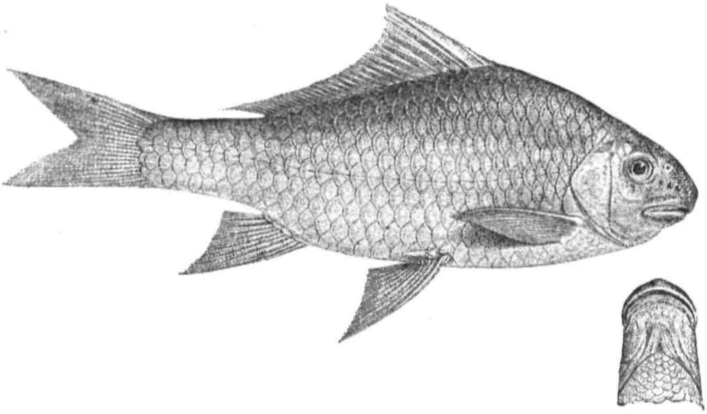

Fig. 97.—*Semiplotus macclellandi.*

absent. *Fins*—dorsal commences midway between the end of the snout and the end of the base of the anal fin, its height slightly exceeding half of that of the body; its last undivided ray strong, osseous, entire, and rather longer than the head excluding the snout. Pectoral nearly as long as the head; it reaches to above the ventral, which is inserted below the fourth or fifth dorsal ray. Anal laid flat nearly reaches the base of the caudal, which latter is deeply forked. *Lateral line*—nearly straight, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin. *Colour*—leaden silver, darkest superiorly; the pectoral, ventral, and anal orange.

Griffith observes that the smaller examples are usually found near rapids, the larger in deeper water, where of an evening they are seen rising, but refuse all baits. McClelland states that this fish is reckoned the most delicious in Assam. I can, however, record from personal observation that it is rich and very liable to set up intestinal irritation.

Hab. Rivers in Assam, especially in the upper portions of that district, but found as low as Goalpara: also Burma. This species is often termed *Rajah-mas*, or "kings' fish," in Upper Assam, as it is asserted that when captured it had to be taken to the Rajahs for their own consumption. As it is very common, this explanation is improbable. More likely a tax was levied on its capture. It attains at least two feet in length.

14. Genus **SCAPHIODON***, Heckel.

Syn. *Capoëta*, sp., and *Chondrostoma*, sp., Cuv. & Val.; *Dillonia*, *Gymnostomus*, sp., Heckel.

Abdomen rounded. Snout rounded. Mouth transverse, inferior, with the mandibular edge nearly straight and sharp; without any knob above the symphysis. The mandibles angularly bent inwards. A horny layer inside the lower jaw, which is not covered by lip. No lower labial fold. Barbels four, two, or absent. Pharyngeal teeth plough-shaped, 5 or 4, 3, 2/2, 3, 4 or 5. Dorsal fin of moderate extent, its last undivided ray being osseous and serrated or entire, or else articulated. Anal rather short. Scales large, of moderate or small size, and sometimes irregularly disposed. Lateral line passing to the centre of the base of the caudal fin.

Geographical Distribution. Rivers of Western Asia extending from those of Eastern Arabia to those in Sind and along the Western Ghats, as low as the Nilgiri hills and rivers at their base.

Synopsis of Indian Species.

A. A pair of maxillary barbels. Last undivided dorsal ray osseous, serrated.

D. 13, L. l. 33, L. tr. 6/6.................... 1. *S. watsoni*, p. 284.
D. 13, L. l. 36, L. tr. 9/9 .... 2. *S. irregularis*, p. 284.

B. Barbels absent.

D. 14–15, L. l. 39. Last undivided dorsal ray articulated. Silvery .... 3. *S. thomassi*, p. 285.

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* Genus CARASSIUS, Nilsson.

Abdomen rounded. Snout obtuse and rounded. Mouth anterior, arched, and rather narrow; lips thin. No barbels. Pharyngeal teeth compressed and in a single series, 4/4. Dorsal fin long, commencing opposite the ventrals, and having its last undivided ray osseous and serrated; last undivided anal ray osseous and normally serrated. Scales of moderate size. Lateral line complete.

Geographical Distribution. Temperate portions of Europe and Asia.

CARASSIUS AURATUS.

Cyprinus auratus, *Linn. Syst. Nat.* vol. i, p. 527.
Carassius auratus, *Day, Fish. India*, p. 552 (see synon.).

B. iii. D. 19–21 (3/16–18). P. 17. V. 9. A. 8 (3/5). C. 19. L. l. 27–29. L. tr. 6½/10. Vert. 18/13.

The gold carp is too well known to require any detailed description. Domesticated forms exhibit almost endless variation.

Mr. Masters is said to have sent three adult specimens from Bombay to the British Museum. Dr. J. Anderson brought examples from high up in Upper Burma, or rather within the borders of China. I doubt whether this fish has ever been found wild in India or Burma.

D. 14-15, L. l. 40-43. Last undivided dorsal ray articulated. A black band along the side; fins with black marks .... 4. *S. nashii*, p. 285.
D. 14, L. l. 40. Last undivided dorsal ray osseous, entire. Silvery .... 5. *S. brevidorsalis*, p. 286.

327. (1.) Scaphiodon watsoni.

Scaphiodon watsoni, *Day, J. A. S. B.* xli, pt. 2, 1872, p. 324; *Fish. India*, p. 551, pl. cxxxv, fig. 2 (see synon.).

B. iii. D. 13 (3/10). P. 15. V. 8. A. 9 (2/7). C. 19. L. l. 33. L. tr. 6/6.

Length of head one fifth, height of body two ninths of the total length. *Eyes*—situated in the last part of the anterior half of the head, diameter two ninths of length of head, 1½ diameters from end of snout. Interorbital space rather convex. Snout rounded, rather overhanging the mouth, and covered with glands; mouth transverse, inferior; mandibles sharp, not enveloped by lip, and having a horny layer inside. *Barbels*—a maxillary pair as long as the eye. *Teeth*—pharyngeal, plough-shaped, 4, 3, 2/2, 3, 4. *Fins*—dorsal commences rather in front of the ventrals, its last undivided ray strong, osseous, serrated, as long as the head without the snout, and nearly as long as the branched rays, which are two thirds as high as the body. Pectoral as long as the head excluding the snout, but not reaching the ventrals. Caudal forked. *Lateral line*—very slightly curved, 3½ rows of scales between it and ventral fin. *Colour*—silvery, dashed with gold; lightest on the abdomen. Various and very irregular black spots on the body.

Hab. Rivers on Sind hills and Salt Range of the Punjab.

328. (2.) Scaphiodon irregularis.

Scaphiodon irregularis, *Day, J. A. S. B.* xli, pt. 2, p. 324; *Fish. India*, p. 551, pl. cxxxv, fig. 3; also *Suppl.* p. 807.

B. iii. D. 13 (3/10). P. 17. V. 8. A. 2/7. C. 19. L. l. 36. L. tr. 9/9.

Length of head one fifth, height of body one fifth of the total length. *Eyes*—situated rather before the middle of the length of head, 1⅓ diameters from end of snout, and also apart. Interorbital space nearly flat. Snout somewhat rounded, covered with glands and having a depression across it from eye to eye. Mouth transverse; upper jaw slightly the longer. *Barbels*—a maxillary pair nearly as long as the eye. *Fins*—dorsal commences rather before the ventrals: its third undivided ray is osseous, weak, and serrated, nearly half as long as the head, whilst the fin is three fourths as high as the body. Pectoral nearly as long as the head Caudal forked, its lower lobe the longer. *Scales*—two or three rows above the lateral line are of a large oblong form, above these are numerous little irregular ones continued forwards to the head;

$4\frac{1}{2}$ rows between the lateral line and the base of the ventral fin. *Colour*—olive, shot with gold.

Hab. Sind hills to 3500 feet elevation.

329. (3.) **Scaphiodon thomassi.**

Scaphiodon thomassi, *Day, Fish. India*, p. 551, pl. cxxxiv, fig. 1.

B. iii. D. 14–15 (3/11–12). P. 16. V. 9. A. 8 (2/6). C. 19. L. l. 39. L. tr. 7/7.

Length of head $5\frac{1}{4}$ to 6, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{3}$ in the length of the head, 2 to $2\frac{1}{4}$ diameters from the end of snout, and 2 apart. Height of head almost equals its length; its width is much less. Snout obtuse, overhanging the mouth, which is transverse; its width equalling that of the head behind the middle of the eyes. Mandible anteriorly with a horny covering. Lips not continuous; the upper one fringed. Large pores on the snout and upper lip, and a line of them continued to under the eye. *Barbels*—absent. *Fins*—dorsal arises slightly nearer to the snout than to the base of the caudal; it is three fourths as high as the body, its last undivided ray weak, articulated. Pectoral as long as the head. Ventral arises under the fourth or fifth dorsal ray; it does not quite reach the anal; the latter when laid flat extends to the caudal, which is deeply forked. *Scales*—$4\frac{1}{2}$ rows between the lateral line and the base of the ventral fin. *Colour*—of a dull silvery colour along the back, with an indistinct silvery band along the side, and of a dull white beneath. A dark band along the dorsal fin, and caudal with a dark outer edge.

Hab. South Canara.

330. (4.) **Scaphiodon nashii.**

Barbus nashii, *Day, P. Z. S.* 1868, p. 584.
Scaphiodon nashii, *Day, Fish. India*, p. 552, pl. cxxxiii, fig. 3.

B. iii. D. 14–15 (2–3/11–12). P. 15. V. 9. A. 7 (2/5). C. 20. L. l. 40–43. L. tr. 7/7.

Length of head $5\frac{1}{4}$ to 6, height of body 4 to 5 in the total length. *Eyes*—diameter 3 to 4 in the length of the head, 1 to $1\frac{1}{2}$ diameters from the end of snout, and $1\frac{1}{2}$ to $1\frac{3}{4}$ apart. Mouth broad, inferior, transverse, and overhung by the snout. In the young the jaws are compressed, each with a cartilaginous covering; the lips at the angle are thick and continuous, not continued across the chin. As age increases the mouth widens, the cartilaginous covering becomes more horny, and the colours of the fish alter. Lips thin, without any transverse fold across the lower one. Snout in the adult covered by papillæ. A thick horny covering inside the lower jaw in adults. *Barbels*—absent. *Teeth*—pharyngeal, crooked, sharp, 5, 4, 3/3, 4, 5. *Fins*—dorsal commences nearer to the snout than to the base of the caudal; it is three fourths as high as the body, its upper edge concave; no osseous ray. Pectoral about as long as

the head. Ventral arises below the middle of the dorsal fin, and does not quite reach the anal, nor the latter the caudal, which is deeply forked. *Scales*—4½ rows between lateral line and base of ventral fin. *Colour*—reddish brown along the back; abdomen silvery. A black band passes from the eye to the centre of the caudal fin. A dark band along the middle third of the dorsal, which is edged above by scarlet; a dark band on anal having a light anterior edge; a dark edging to the caudal. The young are silvery grey along the back, becoming silvery on the sides; the lateral band terminates in a black blotch at the base of the caudal fin.

Hab. Coorg, hill-streams of South Canara, and the Wynaad.

331. (5.) **Scaphiodon brevidorsalis.** (Fig. 98.)

Semiplotus brevidorsalis, *Day, P. Z. S.* 1873, p. 239.
Scaphiodon brevidorsalis, *Day, Fish. India,* p. 552, pl. cxxxiii, fig. 2.

Mean-candee, Tamil.

B. iii. D. 14 (3/11). V. 9. A. 7. L. l. 39–40. L. tr. 7–8/9.

Length of head 6, height of body 3½ in the total length. *Eyes*—diameter 3 to 4 in the length of head, and situated in or rather before the middle of its length, and 2½ diameters apart. Dorsal profile much more convex than that of the abdomen. Snout

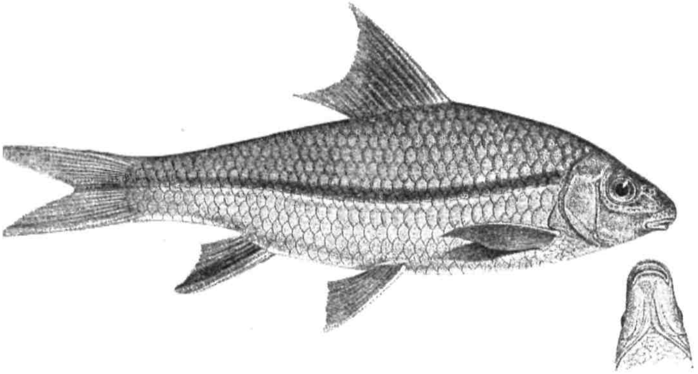

Fig. 98.—*Scaphiodon brevidorsalis.*

swollen, overhanging the jaws; mouth inferior, transverse; three rows of large pores across the snout, and extending on to the preorbital bone; knob at symphysis badly developed: a thin cartilaginous covering to both jaws. Upper lip crenulated. *Barbels*—absent. *Fins*—last undivided dorsal ray osseous, very strong, entire, longer than the head by a distance equal to one diameter of the orbit. Dorsal fin commences midway between the snout and the

base of the caudal; the fin two thirds as high as the body below it. Pectoral falciform, extending to over the ventral, which last is long, reaching to the anal; caudal deeply forked. *Scales*—$4\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—silvery, darkest along the back, fins stained with grey.

Hab. Rivers below the Nilgiri hills in the Madras Presidency.

15. Genus **CATLA**, Cuvier and Valenciennes.

Syn. *Gibelion*, Heckel; *Hypselobarbus*, Bleeker.

Head broad; snout with very thin integuments, upper lip absent, the lower moderately thick, having a continuous and free posterior margin. The lower jaw with a movable articulation at the symphysis, but destitute of any prominent tubercle. No barbels. Gill-rakers long, fine, and closely set. Eyes with free orbital margins. Pharyngeal teeth plough-shaped, 5, 3, 2/2, 3, 5. Dorsal fin rather long, without osseous ray, commencing somewhat in advance of the ventrals; anal short; caudal forked. Scales of moderate size, no tile-like row along the base of the anal fin. Lateral line continuous to the centre of the base of the caudal fin.

332. (1.) **Catla buchanani.** (Fig. 99.)

Cyprinus catla, *Ham. Buch. Fish. Ganges*, pp. 287, 387, pl. 13, fig. 81.
Catla buchanani, *Cuv. & Val.* xvii, p. 411, pl. 515; *Day, Fish. India*, p. 553, pl. cxxxiv, fig. 5 (see synon.).

Botchee, Telugu; *Catla*, Bengal, Hind. and Punj.; *Barkur*, Ooriah; *Nga-thaing*, Burmese; *Tambra*, Hind. in Bombay; *Boassa*, Hind. in N.W. Provinces; *Tay-lee*, Sind.

B. iii. D. 17–19 (3–4/14–16). P. 21. V. 9. A. 8 (3/5). C. 19.
L. l. 40–43. L. tr. $7\frac{1}{2}$/9. Vert. 17/18.

Length of head $4\frac{1}{4}$ to $4\frac{3}{4}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—in the anterior half of the length of the head, diameter 6 to 7 in the length of the head, 2 diameters from the end of the snout, and 3 apart. Mouth wide, lower jaw prominent; in large specimens some pores on the snout. *Fins*—dorsal commences in advance of the ventrals, is two thirds as high as the body, and has a concave upper edge. Pectoral extends to the ventral, and the latter, in males, to the anal. Anal laid flat reaches to beyond the commencement of the caudal. The fins in some specimens are much elongated. *Scales*—from $5\frac{1}{2}$ to $6\frac{1}{2}$ rows between lateral line and base of ventral fin. *Colour*—greyish above, becoming silvery on the sides and beneath. Fins dark-coloured, in some specimens nearly black.

This fish is largely employed for stocking tanks. In May 1875, Mr. Mitchell had a tank, 65 × 58 feet and 13 feet deep, dug upon his ground at Garden Reach, near Calcutta; into it were put some

fry of this species, from ½ to 1 inch or less in length. September 22nd the tank was netted, and several dozens captured, one of the largest weighing 14 oz. and measuring 11 inches in length; the others were 1 or 2 oz. lighter. ('Nature,' Dec. 9th, 1875, xiii, p. 107.)

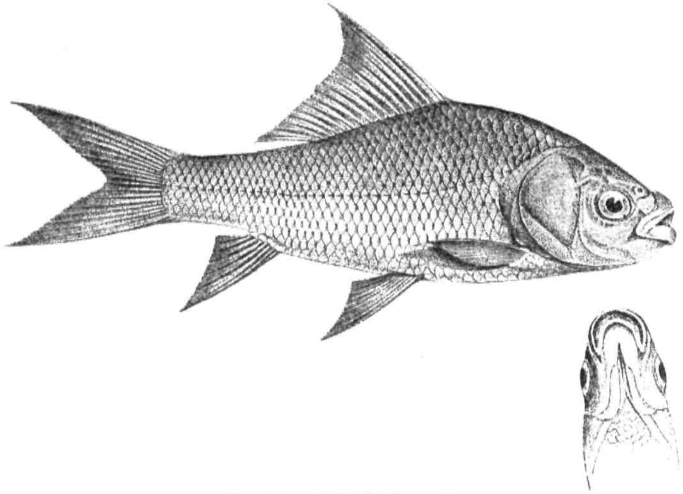

Fig. 99.—*Catla buchanani.*

Hab. Sind, Punjab, throughout India to the Kistna, and eastwards through Bengal, and Burma to Siam; not known to occur in India south of the Kistna, nor in Tenasserim. This fish attains at least 6 feet in length, and is much esteemed as food when not exceeding 2 feet, larger ones are coarse. It resides in fresh or brackish water, being found within tidal influence. "It is a very strong active animal, and often leaps over the seine of the fishermen, on which account, when fishing for the *Catla*, they usually follow the net in canoes, and make a noise by shouting and splashing with their paddles" (*Ham. Buchanan*).

16. Genus **THYNNICHTHYS**, Bleeker.

Syn. *Mola*, pt., Blyth.

Pseudobranchiæ present. Abdomen rounded. Head somewhat compressed; integuments over snout thin; upper lip absent; only a short labial fold on the side of the mandible. Mouth rather wide, antero-lateral, with the lower jaw somewhat prominent. No barbels. Gill-rakers short or absent. Eyes in the middle of the depth of the head, and without any adipose lid. Pharyngeal teeth molariform, compressed, close together, 5, 3 or 4, 2 or 3/3 or 2, 4 or 3, 5. Dorsal fin, short, without osseous ray; ventral

commencing below the dorsal; anal short and entirely posterior to the dorsal. Scales small. Lateral line complete, running to the centre of the base of the caudal fin or a little below. Intestinal tract narrow, and with numerous convolutions.

Geographical Distribution. The Kistna and Godávari rivers from the Deccan to their terminations; also the Malay Archipelago.

333. (1.) **Thynnichthys sandkhol.** (Fig. 100.)

Leuciscus sandkhol, *Sykes, Tr. Z. S.* ii, p. 363.
Thynnichthys sandkhol, *Day, Fish. India,* p. 554, pl. cxxxiv, fig. 2 (see synon.).

Kala-tala and *Akhu-chappah*, Tel.; *Bareing*, Ooriah.

B. iii. D. 12 (3/9). P. 19. V. 9. A. 8 (3/5). C. 19.
L. r. 120. L. tr. 25-30/25.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{4}$ to 4 in the total length. *Eyes*—diameter 3 to 5 in the length of the head, 1 to $1\frac{1}{3}$ diameters from the end of snout, and $1\frac{1}{2}$ to $2\frac{1}{2}$ apart. The width of the head equals one half, and the height four fifths, of its length. *Teeth*—pharyngeal 5, 4, 3/3, 4, 5. *Fins*—dorsal three fourths as high

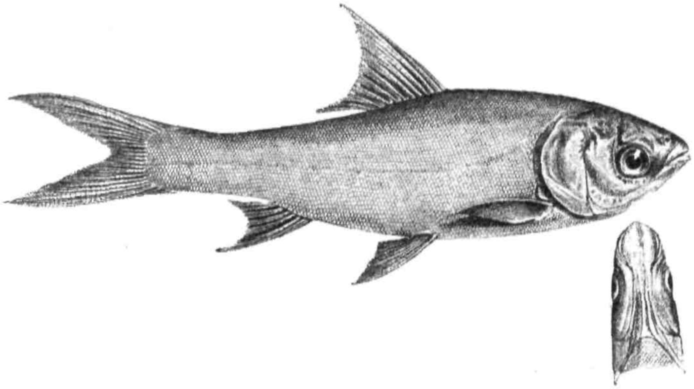

Fig. 100.—*Thynnichthys sandkhol.*

as the body, its upper edge concave, its origin slightly in advance of that of the ventral, and about midway between the snout and the base of the caudal fin, which latter is deeply lobed, the lower lobe being the longer. Anal at some distance behind the vertical from the posterior end of the dorsal. *Scales*—17 to 19 rows between lateral line and base of ventral fin. *Colour*—silvery; head purplish.

Hab. Godávari and Kistna rivers, also the adjacent tanks; attaining above 18 inches in length.

17. Genus AMBLYPHARYNGODON, Bleeker.

Syn. *Mola*, Heckel and Blyth; *Brachygramma*, Day.

Pseudobranchiæ present. Abdomen rounded. Head somewh compressed; integuments over snout thin; upper lip absent; or a short labial fold on the side of the mandible. Mouth rath wide, antero-lateral, with the lower jaw prominent. No barbe Gill-rakers short or absent. Eyes in the middle of the depth the head, and without any adipose membrane. Pharyngeal tee molariform, with the crowns flat or concave, 3, 2, 1/1, 2, Dorsal fin short, without osseous ray, and extending to nearly quite above the commencement of the anal; ventral in advance the dorsal. Scales small. Lateral line incomplete.

Geographical Distribution. From Sind throughout the plains India, Ceylon, and Burma.

Synopsis of Indian Species.

D. 9–10, L. l. 55–65. 9 or 10 rows of scales between lateral line and base of ventral fin. Height of body $3\frac{1}{3}$ in the total length 1. *A. atkinsonii*, p. 29

D. 9, L. l. 65–75. 9 or 10 rows of scales between lateral line and base of ventral fin. Height of body 4 to $4\frac{1}{2}$ in the total length .... 2. *A. mola*, p. 291.

D. 9, L. l. 55–60. Five rows of scales between lateral line and base of ventral fin. Height of body $4\frac{3}{4}$ to 5 in the total length ...... 3. *A. microlepis*, p. 29

D. 9–10, L. l. 50–57. Four rows of scales between lateral line and base of ventral fin. Height of body 5 to $5\frac{1}{2}$ in the total length. 4. *A. melettinus*, p. 29

334. (1.) Amblypharyngodon atkinsonii.

Mola atkinsonii, *Blyth, J. A. S. B.* xxix, 1860, p. 164.
Amblypharyngodon atkinsonii, *Day, Fish. India*, p. 555, pl. cxxx fig. 4 (see synon.).

Nga-pan-ma, Burmese.

B. iii. D. 9–10 (2–3/7). P. 15. V. 9. A. 8 (2/6). C. 19.
L. l. 55–65. L. tr. 14/12.

Length of head 4 to $4\frac{2}{3}$, height of body $3\frac{1}{3}$ in the total lengt *Eyes*—in the front half of the head, 4 to $4\frac{1}{4}$ diameters in the leng of the head, 1 diameter from end of snout, and $1\frac{1}{2}$ apart. Abd minal and dorsal profiles about equally convex. *Fins*—dorsal tv thirds as high as the body, its upper edge concave, it commenc slightly behind the origin of the ventral. Anal arising on the vertic just posterior to the end of the dorsal. *Lateral line*—ceases aft 19 scales; there are 9 or 10 rows between it and the base of th ventral fin. *Colour*—silvery, with a golden gloss about the head

Hab. Throughout Burma; attaining at least 6 inches in lengt

335. (2.) **Amblypharyngodon mola.** (Fig. 101.)

Cyprinus mola, *Ham. Buch. Fish. Ganges*, pp. 334, 392, pl. 38, fig. 92.
Amblypharyngodon mola, *Day, Fish. India*, p. 555, pl. cxxxv, fig. 4 (see synon.).

Talla-maya, Tel.; *Moraru*, Ooriah; *Moah*, Assam; *Mukni*, Punj.; *Nga-beh-byoo* and *Nga-zen-zap*, Burmese.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 65–75. L. tr. 12/12.

Length of head about 5, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{3}{4}$ to 1 diameter from end of snout, and $1\frac{1}{4}$ apart. Dorsal profile more convex than that of the abdomen. *Fins*—origin of dorsal behind

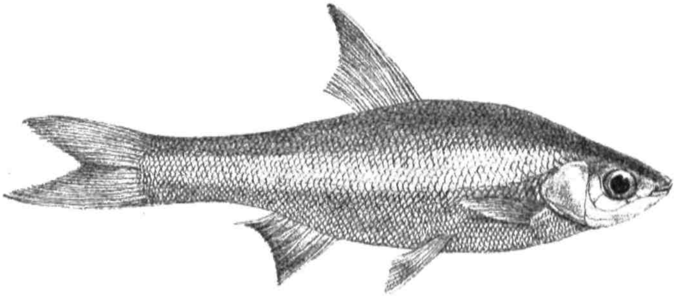

Fig. 101.—*Amblypharyngodon mola.*

the insertion of the ventral, upper edge concave. Caudal deeply forked. *Lateral line*—extends along about 15 scales, and there are 9 or 10 rows between it and the base of the ventral fin. *Colour*—a silvery lateral band, and usually dark markings on the dorsal, caudal, and anal fins.

Hab. From Sind throughout India (except the Malabar coast), Assam and Burma.

336. (3.) **Amblypharyngodon microlepis.**

Leuciscus microlepis, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Beng en Hind.* p. 141.
Amblypharyngodon microlepis, *Day, Fish. India*, p. 555, pl. cxxxv, fig. 5 (see synon.).

B. iii. D. 9 (2/7). P. 14. V. 9. A. 7 (2/5). C. 19. L. l. 55–60.
L. tr. 11/8.

Length of head $4\frac{3}{4}$ to 5, height of body $4\frac{3}{4}$ to 5 in the total length. *Eyes*—diameter $3\frac{2}{3}$ to 4 in length of head, less than 1 diameter from end of snout. Dorsal profile rather more convex than that of the abdomen. *Fins*—origin of dorsal slightly behind the origin of the ventral, its upper edge concave, its last ray divided to its base; caudal forked, lower lobe the longer. *Lateral line*—ceases after a few scales, 5 rows between it and base of ventral fin. *Colour*—a rather broad silvery lateral band.

Hab. From the Hooghly through Orissa and down the Coro-

337. (4.) Amblypharyngodon melettina.

Leuciscus melettina, *Cuv. & Val. H. N. Poiss.* xvii, p. 304, pl. 501.
Amblypharyngodon melettinus, *Day, Fish. India*, p. 555, pl. cxxxiv, fig. 3 (see synon.).

Wumboo, Mal.; *Oolaree*, Tam.; *Kali-korafi*, Hind.; *Paraga*, Can.

B. iii. D. 9–10 (2–3/7). P. 15. V. 9. A. 7–8 (2–3/5). C. 19. L. l. 50–57. L. tr. 10/8.

Length of head 5 to $5\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—4 diameters in the length of the head, 1 diameter from end of snout, and $1\frac{1}{4}$ apart. *Teeth*—pharyngeal, with rather concave summits. *Fins*—origin of dorsal behind the insertion of the ventral, its upper edge concave; caudal rather deeply forked. *Lateral line*—extends along 15 to 20 rows of scales, 4 rows between it and the base of the ventral fin. *Colour*—greenish along the back, becoming silvery on the sides and beneath; a bright greenish-yellow band divides the colours of the back from a silvery line passing along the side.

Hab. (Bombay, according to Cuv. and Val.) Malabar coast, and Southern India, from the Nilgiris to Madras, also Ceylon.

18. Genus MATSYA, gen. nov.

Syn. *Acanthonotus*, Tickell, *nec* Bloch & Schneider.

Mouth arched, anterior; barbels absent, eyes without adipose lids. Dorsal fin rather short, commencing slightly in front of the root of the ventral, its osseous ray strong, serrated and preceded

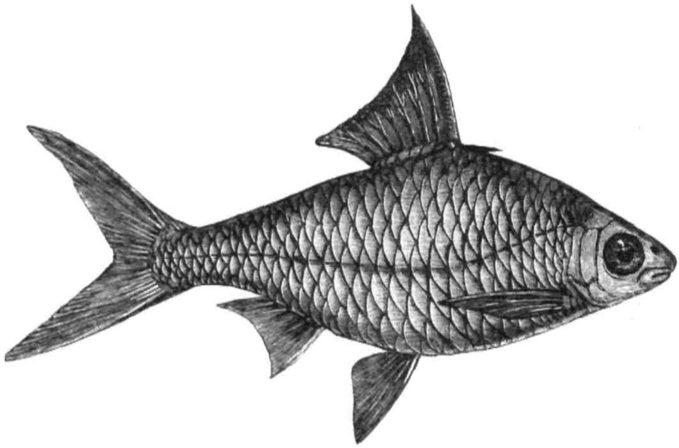

Fig. 102.—*Matsya argentea.*

at its base by a small forwardly directed spine; anal short. Scales large, no enlarged row at base of anal fin. Lateral line complete and continued to opposite the centre of the base of the caudal.

338. (1.) **Matsya argentea.** (Fig. 102.)

Acanthonotus argenteus, *Tickell, MSS.*; *Day, Fish. India, Supplement*, p. 807.

D. 9 (1/8). P. 14. V. 8. A. 7. C. 18. L. l. 30.

Length of head as delineated 6, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of the head, 1 diameter from the end of the snout. Snout blunt, rather overhanging the mouth, body compressed; profile with a considerable rise from snout to base of dorsal fin. *Fins*—dorsal spine strong and posteriorly serrated, caudal deeply forked, its lobes acutely pointed. A small horizontal spine in front of the dorsal fin pointing forwards and scarcely protruding from beneath the skin. *Lateral line*—complete. *Colour*—brilliant silvery, with lilac and blue shades and a tinge of olive-yellow on the back. Dorsal fin orange-scarlet, superiorly bordered with black except on the last two rays, the other fins lemon-yellow. Dorsal ridge black in its upper portion.

Hab. Very common in the streams of the interior of the Tenasserim district, the largest obtained being about 5·4 inches in length.

19. Genus **BARBUS**, Cuvier & Valenciennes.

Syn. *Puntius*, pt., Ham. Buch.; *Labeobarbus, Varicorhinus*, pt., Rüpp.; *Systomus*, pt., McClell.; *Capoëta*, sp., Cuv. & Val.; *Pseudobarbus*, Bielz.; *Luciobarbus*, Heckel; *Cheilobarbus*, sp., Smith; *Balantiocheilus*, *Hemibarbus*, *Cyclocheilichthys*, *Siaja*, *Anematichthys*, *Hypselobarbus*, *Gonoproktopterus*, *Gnathopogon*, *Hampala*, sp., Bleeker; *Enteromius*, sp., Cope.

Mouth arched, and anterior or inferior; jaws closely invested by the lips, which may have leathery lobes, but no horny covering *. Barbels four (*Barbodes*, Bleeker); or two (*Capoëta*, Cuv. & Val.); or none (*Puntius*, H. Buch.). Eyes without adipose lids. Pharyngeal teeth 5 or 4, 3 or 4, 2 or 3/3 or 2, 3 or 4, 4 or 5. Dorsal fin rather short, commencing nearly opposite the root of the ventral; its last undivided ray either ossified and serrated or entire, or articulated and not osseous; anal rather short, in some species its second ray ossified, or its last undivided ray may even be serrated (*B. prodozyson*, Bleeker). Scales large, of moderate or small size; anal scales not enlarged. Lateral line complete or incomplete †, when complete it is continued to opposite the centre of the base of the caudal fin.

Barbus mahecola, C. V., which has two barbels, is very similar to

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* *Barbus lithopidos* is an exception.

† The number of rows of scales between the lateral line and insertion of the ventral fin, in species in which the former is incomplete, is counted from the row of scales on which the lateral line would have existed had it been complete.

B. filamentosus, C. V., with none. If a number of examples are examined, it will be found that in some these appendages are minute, the barbels being as a rule smallest in specimens obtained furthest from the hills. In South Canara, the Wynaad, and base of the Nilgiris, where the barbels are large, the *B. mahecola* abounds; towards Cochin and up the Coromandel coast as far as Madras that species is small or absent, and the *B. filamentosus* is the type. Here, undoubtedly, the question must force itself on one's notice, Are we dealing with two distinct species, or one in a state of transition? The adults of *Barbus punctatus* and *B. phutunio* are often exactly similar, but in the immature form the first retains its original colour, not so the second. *Barbus chola* and *B. tetrarupagus* are similar, except as to the presence of a black spot behind the opercle in the latter; whilst *Barbus ticto* shows considerable variations. Great changes evidently occur in some species if they are removed to another locality: thus *Barbus conchonius*, which has been imported from the plains and introduced into the Naini Tal lake, is evidently losing the serrature of its dorsal spine; in time, if this change goes on, the species will become more like *B. torio* than the original form.

The majority of those species which constitute the subgenus *Barbodes* (4 barbels), provided they are soberly coloured, attain a large size; the brilliantly coloured forms are mostly residents in clear and rapid mountain-streams or rivers contiguous to hills and are generally small. A strong dorsal spine is usually (if not invariably) a sign that the species lives in the vicinity of high mountains, up the streams of which it ascends to breed; an exception, however, has to be made of those forms having serrated dorsal spines, and which are usually residents of waters of the plains. Considerable individual variations exist as to the comparative length and size of the dorsal spine; as a rule it increases in strength in the adult.

Species of the subgenus *Capoëta* (2 barbels) never attain the size reached by many of the *Barbodes*; some, more especially when residing in mountain-streams, have vivid colours. The species of the subgenus *Puntius* are mostly of small size; a few are brilliantly coloured.

Geographical Distribution. Europe, and throughout Asia and Africa. Representatives of this genus exist in most, if not all, Indian and Burmese rivers and tanks, the larger species being generally termed Mahseers. Some attain an enormous size, as much as 90 lb. and upwards; these are more frequently residents in rivers along the bases of hills or in large rapids, but a few have a more extended range. The number of species appears to diminish as the Malay Archipelago is approached, whilst those forms having 4 barbels and also an osseous and serrated dorsal ray increase largely in proportion to the others.

Synopsis of Indian Species.

A. With four barbels. (*Barbodes.*)

a. Last undivided dorsal ray osseous and serrated.

D. 3/8, A. 3/5, L. l. 44–47. Pores on snout and head. Colour uniform . . 1. *B. chagunio*, p. 299.

D. 3/8, A. 3/5, L. l. 42. Pores on snout. Colour uniform . . . . 2. *B. clavatus*, p. 300.

D. 3–4/8, A. 3/5, L. l. 32–34. Colour uniform; in Burma the caudal has a dark inner edge . . . . 3. *B. sarana*, p. 300.

D. 4/8, A. 3/5, L. l. 28–30. A dark lateral blotch . . . . 4. *B. chrysopoma*, p. 301.

D. 3/8, A. 2/5, L. l. 29–30. A black lateral blotch, fins orange . . . . 5. *B. pinnauratus*, p. 301.

D. 3/8, A. 3/5, L. l. 28. A black band from eye to middle of tail . . . . 6. *B. pleurotænia*, p. 302.

D. 3/8, A. 2/5, L. l. 24. Serrated dorsal ray weak. Colour uniform . . 7. *B. goniosoma*, p. 302.

D. 3/8, A. 2/5, L. l. 22. Caudal, anal, and ventrals red . . . . 8. *B. roseipinnis*, p. 303.

b. Last undivided dorsal ray osseous and entire.

D. 4/9, A. 2/5, L. l. 42. No pores on snout. 5 scales between l. l. and ventral. Dorsal spine strong, nearly as long as head . . . . 9. *B. dubius*, p. 303.

D. 4/9, A. 2–3/5, L. l. 39–41. Dorsal spine strong, a little longer than head, 3 scales between l. l. and ventral . . . . 10. *B. micropogon*, p. 304.

D. 3/7–8, A. 2/5, L. l. 32–35. Lower lip with a continuous transverse fold. Dorsal spine strong. 3 scales between l. l. and ventral . . . . 11. *B. chilinoides*, p. 304.

D. 4/8, A. 2/5, L. l. 30–32. Lower labial fold interrupted. Dorsal spine strong. 3½ scales between l. l. and ventral . . . . 12. *B. carnaticus*, p. 305.

D. 3/9, A. 2/5, L. l. 28–31. Lower labial fold interrupted. Dorsal spine strong, as long as the head excluding the snout. 2½ scales between l. l. and ventral . . . . 13. *B. hexagonolepis*, p. 305.

D. 4/9, A. 2/5, L. l. 28–29. Lower labial fold interrupted. Large pores on cheeks. Dorsal spine strong, as long as head excluding the snout. 2½ scales between l. l. and ventral 14. *B. dukai*, p. 306.

D. 3/9, A. 2/5, L. l. 25–27. Dorsal spine strong, as long as the head excluding the snout. Upper jaw the longer, lips lobed. 2½ scales between l. l. and ventral . . . . 15. *B. tor*, p. 307.

D. 3-4/9, A. 2/5-6, L. l. 25-26. Dorsal spine strong. $2\frac{1}{2}$ scales between l. l. and ventral .... 16. *B. hexastichus*, p. 308.

D. 3/9, A. 3/5, L. l. 24-26. Lower labial fold entire. Dorsal spine of moderate strength and as long as the head excluding the snout. $2\frac{1}{2}$ scales between l. l. and ventral .... 17. *B. bovanicus*, p. 308.

D. 3/9, A. 2/5, L. l. 25. Dorsal spine weak, $2\frac{1}{2}$ scales between l. l. and ventral .... 18. *B. sophore*, p. 309.

D. 2/9, A. 2/5, L. l. 23. Dorsal spine strong. $2\frac{1}{2}$ scales between l. l. and ventral .... 19. *B. stracheyi*, p. 309.

c. Last undivided ray articulated, or if osseous very weak.

D. 3/9, A. 3/5, L. l. 41. $3\frac{1}{2}$ scales between l. l. and ventral .... 20. *B. curmuca*, p. 310.

D. 3/9, A. 3/5, L. l. 38-39. 4 scales between l. l. and ventral. Of a slate colour .... 21. *B. lithopidos*, p. 310.

D. 3-4/9, A. 3/5, L. 31/34. $2\frac{1}{2}$ scales between l. l. and ventral. Each scale with a red mark; dorsal and caudal fins lake colour .... 22. *B. thomassi*, p. 311.

D. 3/9, A. 3/7 .... 23. *B. spinulosus*, p. 311.

D. 3/9, A. 2/5, L. l. 30-32. $3\frac{1}{2}$ scales between l. l. and ventral. Upper half of body dark; a light band from eye to tail .... 24. *B. pulchellus*, p. 311.

D. 3-4/9, A. 3/5, L. l. 30-32. Length of head 6 in total. $3\frac{1}{2}$ scales between l. l. and ventral .... 25. *B. dobsoni*, p. 312.

D. 3/9, A. 3/5, L. l. 27-28. Length of head 5 to $5\frac{1}{4}$ in total. $2\frac{1}{2}$ to $3\frac{1}{2}$ scales between l. l. and ventral.... 26. *B. jerdoni*, p. 312.

D. 4/9, A. 3/5, L. l. 26-28. $2\frac{1}{2}$ to 3 scales between l. l. and ventral .... 27. *B. wynaadensis*, p. 313.

D. 3/9, A. 3/5, L. l. 27. $2\frac{1}{2}$ scales between l. l. and ventral .... 28. *B. stevensonii*, p. 313.

D. 4/9, A. 3/5, L. l. 24-26. $3\frac{1}{2}$ scales between l. l. and ventral.......... 29. *B. neilli*, p. 314.

D. 3-4/9, A. 3/5, L. l. 24. $1\frac{1}{2}$ scales between l. l. and ventral......... 30. *B. malabaricus*, p. 314.

D. 3/9, A. 2/5, L. l. 24. 3 scales between l. l. and ventral .... 31. *B. innominatus*, p. 315.

D. 3/9, A. 3/5, L. l. 22. $3\frac{1}{2}$ scales between l. l. and ventral............ 32. *B. compressus*, p. 315.

D. 3/9, A. 3/5, L. l. 22. $2\frac{1}{2}$ scales between l. l. and ventral............ 33. *B. blythii*, p. 315.

D. 3/8 A. 2/5, L. l. 20. 2 scales between l. l. and ventral. Red, with three vertical black bands .... 34. *B. melanampyx*, p. 316.

B. With two barbels. (*Capoëta.*)

a. Last undivided dorsal ray osseous, serrated.

D. 4/8, A. 2/5, L. l. 26. $2\frac{1}{2}$ scales between l. l. and ventral.......... 35. *B. macrolepidotus*, p. 316.

b. Last undivided dorsal ray osseous, entire.

D. 3/8, A. 2/5, L. l. 26–28. Narrow suborbitals. 3 to $3\frac{1}{2}$ scales between l. l. and ventral. A lateral blotch, and two bands on dorsal fin ...... 36. *B. chola*, p. 317.

D. 3/8, A. 3/5, L. l. 25. Wide suborbitals. $3\frac{1}{2}$ scales between l. l. and ventral. A dark lateral blotch.... 37. *B. parrah*, p. 317.

D. 4/8, A. 2/5, L. l. 26. 2 scales between l. l. and ventral .... 38. *B. burmanicus*, p. 318.

D. 2–3/8, A. 2/5, L. l. 24–26. $3\frac{1}{2}$ scales between l. l. and ventral. A black spot behind gill-opening, a second near base of caudal fin; a band on dorsal fin .... 39. *B. tetrarupagus*, p. 318.

D. 3–4/8, A. 3/5, L. l. 24–25 $2\frac{1}{2}$ scales between l. l. and ventral. A black spot at end of base of dorsal fin. 40. *B. dorsalis*, p. 319.

c. Last undivided dorsal ray articulated, or if osseous very weak.

D. 3–4/9, A. 3/5, L. l. 40–43. 4 to 5 scales between l. l. and ventral .... 41. *B. kolus*, p. 319.

D. 2–3/8, A. 3/5, L. l. 28. $2\frac{1}{2}$ scales between l. l. and ventral. Body longitudinally banded .... 42. *B. denisonii*, p. 320.

D. 2/8, A. 2/5. 3 scales between l. l. and ventral. A light band along the side; a deep black lateral blotch .. 43. *B. melanostigma*, p. 320.

D. 2/8, A. 3/5, L. l. 26. $3\frac{1}{2}$ scales between l. l. and ventral .... 44. *B. arenatus*, p. 321.

D. 2/7, A. 3/5, L. l. 24. $2\frac{1}{2}$ scales between l. l. and ventral. A black mark along base of dorsal. A dark lateral blotch sometimes present .. 45. *B. puckelli*, p. 321.

D. 2–3/8, A. 2/5, L. l. 23–24. 2 scales between l. l. and ventral. A dark lateral blotch sometimes present .. 46. *B. amphibius*, p. 322.

D. 3/8, A. 2/5, L. l. 23. $2\frac{1}{2}$ scales between l. l. and ventral. Body vertically banded................ 47. *B. arulius*, p. 322.

D. 3/8, A. 2/5, L. l. 21. $2\frac{1}{2}$ scales between l. l. and ventral. A deep lateral blotch .... 48. *B. mahecola*, p. 323.

C. Without barbels. (*Puntius.*)

a. Last undivided dorsal ray osseous, serrated.

D. 4/8, L. l. 36, complete. $5\frac{1}{2}$ scales between l. l. and ventral. Each scale with a dark base .... 49. *B. apogon*, p. 324.

D. 3/8, L. l. 36, incomplete. 6 scales

between l. l. and ventral. A black lateral blotch, another at base of anterior dorsal rays .... 50. *B. ambassis*, p. 324.
D. 3/8, L. l. 26, incomplete. 4½ scales between l. l. and ventral. A black spot on side over anal fin .... 51. *B. conchonius*, p. 325.
D. 3/8, L. l. 23–26, incomplete. Two black spots, one at commencement of l. l., another at side of tail .... 52. *B. ticto*, p. 325.
D. 2–3/8, L. l. 25, complete. Two black marks on lateral line .... 53. *B. stoliczkanus*, p. 326.
D. 3/8, L. l. 23, complete. Two black spots, one below commencement of l. l., the other near its termination.. 54. *B. punctatus*, p. 326.
D. 2–3/8, L. l. 23–24, incomplete. A black band over tail, a black spot across the bases of the first six dorsal rays, and another over base of anal. 55. *B. gelius*, p. 327.
D. 2–3/8, L. l. 20–23, incomplete. Four vertical black bands on a brown body, and a dark one down the centre of the dorsal fin .... 56. *B. phutunio*, p. 327.
D. 3/8, A. 3/5, L. l. 21, incomplete. 3 scales between l. l. and ventral. Two dark vertical bands........... 57. *B. cumingii*, p. 328.
D. 3/8, L. l. 20, complete. Three vertical black bands on body .... 58. *B. nigrofasciatus*, p. 328.
D. 2/8, L. l. incomplete .... 59. *B. guganio*, p. 328.

b. Last undivided dorsal ray osseous, entire.
D. 3/8, L. l. 23–26, complete. A dark mark near posterior extremity of l. l., another across base of middle dorsal rays .... 60. *B. stigma*, p. 329.
D. 3/8, L. l. 23–25, complete. Fins black-tipped .... 61. *B. chrysopterus*, p. 329.
D. 3/8, A. 3/5, L. 24, incomplete. 3½ scales between l. l. and ventral. A dark mark at side of base of tail . 62. *B. thermalis*, p. 330.
D. 3/8, L. l. 22–23, incomplete. A black mark on side above anal, sometimes continued by a band to the caudal, a second indistinct one under posterior end of dorsal............ 63. *B. terio*, p. 330.

c. Last undivided dorsal ray articulated, or if osseous very weak.
D. 3/8, L. l. 43, incomplete. A silvery band along side, a black spot at base of caudal, and two first dorsal rays black. 64. *B. punjabensis*, p. 331.
D. 3/8, L. l. 24, incomplete. A black mark at base of each dorsal ray.... 65. *B. unimaculatus*, p. 331.
D. 2–3/8, A. 2/5, L. l. 23, incomplete. A lateral blotch .... 66. *B. waagenii*, p. 332.
D. 3/8, L. l. 22, incomplete. Uniform, a dark spot across middle of anterior dorsal rays .... 67. *B. cosuatis*, p. 332.
D. 2/8, L. l. 20–22, incomplete. Four black spots on side, and a black streak down dorsal fin .... 68. *B. vittatus*, p. 333.

D. 3/8, L. l. 21, complete. Branched dorsal rays elongated. A black mark near posterior end of l. l., and each caudal lobe with a black extremity. 69. *B. filamentosus*, p. 333.
D. 3/8, L. l. 23, incomplete. A black band encircles the free portion of the tail.......................... 70. *B. puntio*, p. 334.

A. With four barbels (*Barbodes*).

339. (1.) **Barbus chagunio.** (Fig. 103.)

Cyprinus chagunio, *Ham. Buch. Fish. Ganges*, pp. 295, 387.
Barbus chagunio, *Day, Fish. India*, p. 559, pl. cxxxvi, fig. 1 (variety *spilopholus*), and pl. cxl, fig. 2 (see synon.).

Jerruah, Beng.; *Chaguni*, Behar.; *Pootee keintah*, Assam.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19. L. l. 44–47. L. tr. 11/9.

Length of head $4\frac{1}{2}$ to 5, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 5 to $6\frac{1}{2}$ in length of head, 2 to 3 diameters from end of snout, $1\frac{1}{2}$ diameters apart. Suborbital region, cheeks, and anterior upper margin of the orbit usually covered with numerous pores. *Barbels*—both pairs rather longer than the orbit. *Fins*—dorsal commences midway between the end of the snout and the base of the caudal fin, its last undivided ray is osseous, strong, with coarse teeth: some of the last few anal rays in large specimens may be elongated (*B. spilophilus*), but more

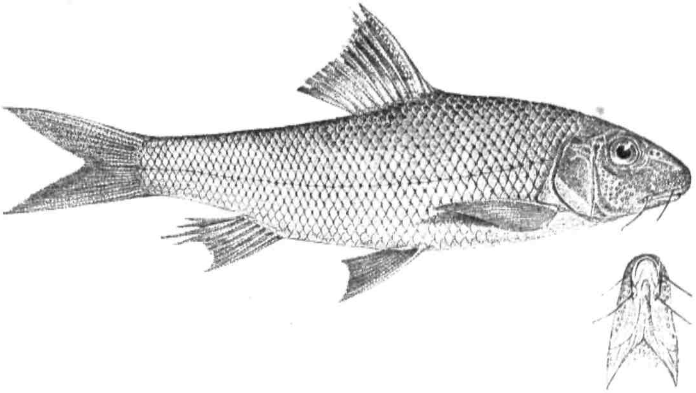

Fig. 103.—*Barbus chagunio.*

frequently are not so. *Lateral line*—complete, with from $5\frac{1}{2}$ to $6\frac{1}{2}$ rows of scales between it and the base of the ventral; 15 rows before the dorsal fin. Free portion of the tail as high as long. *Colour*—uniform silvery, with a pinkish tinge, the scales towards the back sometimes being darkest at their bases; fins reddish with light outer edges, the summit of the dorsal fin sometimes black. The young have a silvery band along the side.

Hab. From Orissa, throughout Bengal, Assam, Behar, and the N.W. Provinces to the Punjab, but not recorded from Sind, the Deccan, Western coast, Mysore, Madras, or Burma. This species attains at least 18 inches in length.

340. (2.) **Barbus clavatus.**

Barbus clavatus, *McClelland, Cal. Journ. N. H.* v, 1845, p. 280, pl. 21, fig. 2; *Day, Fish. India*, p. 560 (see synon.).

B. iii. D. 11 (3/8). P. 16. V. 10. A. 8 (3/5). C. 19. L. l. 42. L. tr. 6/4.

Height of the body one fourth of the length excluding the caudal fin. *Eyes*—large and in the middle of the length of the head. Snout covered with small thorny tubercles. *Barbels*—two well-developed pairs. *Fins*—last undivided dorsal ray osseous, strong, serrated, and as long as the body is high. *Scales*—11½ rows in an oblique line from the base of the ventral to the dorsal. The figure shows 4½ rows between the lateral line and base of the ventral, which would give 6½ above the lateral line. *Colour*—blue superiorly, becoming white beneath: the fins pale bluish white.

Hab. A single specimen (7 inches long) was obtained from a river at the base of the Sikhim mountains in Bengal.

341. (3.) **Barbus sarana.**

Cyprinus sarana, *Ham. Buch. Fish. Ganges*, pp. 307, 388.
Barbus saranus, *Day, Fish. India*, p. 560, pl. cxxxvi, fig. 2 (see synon.).

Pungella, Tam.; *Giddi-kaoli*, *Durhie* and *Potah*, Hind.; *Gid-pakke*, Can.; *Kannaku*, Tel.; *Sarana*, Ooriah and Beng.; *Jundoori*, Punj.; *Kudali* and *Pitule*, Maráthi; *Poppree* and *Kuh-nah-nee*, Sind.; *Sen-nee*, Assam; *Nga-khon-mah-gyee* and *Nga-chong*, Burmese.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19. L. l. 32–34. L. tr. 5½–6/6.

Length of head 5 to 5¼, height of body 3½ to 3⅔ in the total length. *Eyes*—diameter 4¼ to 4¾ in the length of head, 1 to 1⅓ diameters from the end of snout, and 2 diameters apart. No pores on the snout. *Barbels*—the rostral pair about as long as the orbit, the maxillary pair longer, sometimes equalling 1½ diameters of the orbit. *Fins*—dorsal commences slightly nearer to the snout than to the base of the caudal fin, and opposite the insertion of the ventral; its last undivided ray osseous, strong in the adult, finely serrated posteriorly, and with its stiff portion two thirds as long as the head, the fin is one half to two thirds as high as the body, with its upper edge concave. *Lateral line*—complete, from 3½ to 4 rows of scales between it and the base of the ventral fin: 10 to 11 rows before the dorsal fin. *Colour*—silvery, darkest superiorly, opercles shot with gold; the young have occasionally a dull blotch on the lateral line before the base of the caudal fin.

Mostly some dark spots behind the opercle. When the fish is fresh there are sometimes horizontal bands along the rows of scales in the upper half of the body. Fins whitish or yellowish white, and externally stained with grey.

Hab. Sind and the Punjab, throughout India, Assam, and Burma, in which latter country the caudal fin has sometimes a black upper and lower edge and a dark mark at the base of each scale. This fish attains at least a foot in length.

342. (4.) **Barbus chrysopoma.**

Barbus chrysopoma, *Cuv. & Val. H. N. Poiss.* xvi, p. 165, pl. 466; *Day, Fish. India*, p. 561 (see synon.).

Munduttee, Mal.; *Pungela*, Tamil.

B. iii. D. 12 (4/8). P. 17. V. 9. A. 8 (3/5). C. 19. L. l. 28–30. L. tr. 6/6.

Length of head $4\frac{1}{3}$ to 5, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of the head (in a specimen 2·6 inches in length the eye is at least $2\frac{1}{4}$ in the length of the head), 1 diameter from the end of snout, and 1 to $1\frac{1}{4}$ apart. *Barbels*—the rostral very thin, not so long as the eye; the maxillary as long as the orbit. *Fins*—dorsal commences midway between the front edge of the eye and the base of the caudal fin and opposite the insertion of the ventral; its last undivided ray osseous, of moderate strength, finely serrated posteriorly, and with its stiff portion as long as the head excluding the snout; the height of the fin is two thirds to three fourths that of the body below it, the upper edge concave. *Lateral line*—complete, and a little more concave than in the next species, whilst it is sometimes sinuous in the last part of its course; 4 rows of scales between it and the base of the ventral fin; 12 rows before the base of the dorsal fin. *Colour*—dark silvery, lightest beneath, opercles shot with purple and gold. A dark vertical band behind the opercles and a dull spot on the lateral line just anterior to the base of the caudal fin. Upper and lower margins of the caudal greyish; the other fins golden.

The eyes in this species are larger than in *B. sarana*, and not so far apart.

Hab. Fresh waters along the coasts of India from Cutch to Bengal, also the Deccan, Mysore, and Madras. I have likewise received this species from Darjeeling.

343. (5.) **Barbus pinnauratus.**

Puntius pinnauratus, *Day, Fish. Malabar*, p. 209, pl. xv, fig. 2.
Barbus pinnauratus, *Day, Fish. India*, p. 561, pl. cxxxix, fig. 3 (see synon.).

B. iii. D. 11 (3/8). P. 17. V. 8. A. 7 (2/5). C. 19. L. l. 29–30. L. tr. $5\frac{1}{2}$–6/6.

Length of head 5 to $5\frac{1}{3}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total

length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, nearly or quite 1 diameter from the end of snout, and $1\frac{1}{4}$ to $1\frac{2}{3}$ apart. Body compressed. *Barbels*—the maxillary pair are one half longer than the orbit, the rostral pair a little shorter. *Fins*—dorsal commences slightly in advance of the insertion of the ventral, and two thirds as high as the body, having its upper edge concave, its last undivided ray osseous (weak in the young, but strengthening with age), as long as the head excluding the snout, and posteriorly serrated. *Lateral line*—complete, $3\frac{1}{2}$ or 4 rows of scales between it and the base of the ventral fin; 10 rows before the dorsal fin. *Colour*—silvery along the back and upper half of the body, becoming white shot with gold beneath; most of the scales with black bases. A dark band behind the opercles and a black blotch on the lateral line, commencing about the twenty-fourth scale. Opercles and fins orange, caudal with a black superior and inferior edge.

Hab. From fresh waters at Cocanada down the East coast of India to Ceylon, and inland as far as the Nilgiris, also along the Western ghats and rivers at their bases. The largest example obtained was $10\frac{1}{2}$ inches in length.

344. (6.) Barbus pleurotænia.

Puntius (Barbodes) pleurotænia, *Bleeker, Cobit. et Cypr. Ceylon, in Haarlem, Nat. Verh. Holland. Maatsch.* xx, 1864, p. 13, t. 3, fig. 2.
Barbus pleurotænia, *Day, Fish. India*, p. 562 (see synon.).

B. iii. D. 11 (3/8). P. 14. V. 9. A. 8 (3/5). C. 19. L. l. 27–29. L. tr. $5/4\frac{1}{2}$.

Length of head about $5\frac{1}{4}$, height of body 4 in the total length. *Eyes*—diameter two sevenths of length of head, 1 to $1\frac{1}{4}$ diameters from end of snout, and slightly more apart. *Barbels*—both pairs somewhat longer than the orbit. *Fins*—dorsal commences over the ventral, and midway between the end of the snout and the base of the caudal; its last undivided ray is osseous, very strong, serrated posteriorly, and as long as the head, the upper margin of the fin concave; caudal forked. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the root of the ventral; 10 rows before the dorsal fin. *Colour*—a black band extends from the eye to the termination of the central caudal rays.

Hab. Ceylon.

345. (7.) Barbus goniosoma.

Puntius (Barbodes) goniosoma, *Bleeker, Atl. Ich.* iii, p. 105, t. 31, fig. 1.
Barbus goniosoma, *Day, Fish. India*, p. 562, pl. cxxxvii, fig. 2 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 8. A. 7 (2/5). C. 19. L. l. 24. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head about 5, height of body $3\frac{1}{4}$ in the total length.

Eyes—diameter two sevenths of length of head, 1 diameter from end of snout, and $1\frac{1}{4}$ apart. Body elevated to the base of dorsal fin, whilst it is strongly compressed. Rostral barbels extend to below the middle of the eye; maxillary to opposite the posterior margin of the orbit. *Fins*—origin of dorsal slightly posterior to the insertion of the ventrals; dorsal spine osseous, strong, as long as the head without the snout, and finely serrated posteriorly in its whole extent; the fin is one half as high as the body. Caudal forked, the lower lobe the longer. *Scales*—$2\frac{1}{2}$ rows between lateral line and base of ventral fin; 9 rows before dorsal. *Colour*—silvery, fins orange.

Hab. Mergui to Sumatra, growing to 6 inches in length.

346. (8.) **Barbus roseipinnis.**

Barbus roseipinnis, *Cuv. & Val. H. N. Poiss.* xvi, p. 169; *Day, Fish. India*, p. 562 (see synon.).

B. iii. D. 11 (3/8). A. 7 (2/5). C. 20. L. l. 22.

Dorsal profile elevated. *Eyes*—large. *Barbels*—four, thin and long. *Fins*—dorsal with its last undivided ray osseous, of moderate strength and serrated. *Colour*—silvery; ventral, anal, and caudal fins reddish, the lower border of the last tinged with black.

Hab. Pondicherry, whence M. Bélanger brought specimens $4\frac{1}{2}$ inches in length.

347. (9.) **Barbus dubius.**

Puntius (Barbodes) dubius, *Day, P. Z. S.* 1867, p. 291.
Barbus dubius, *Day, Fish. India*, p. 562, pl. cxxxvii, fig. 1 (see synon.).

Collee-arengean candee, Tam.

B. iii. D. 13 (4/9). P. 17. V. 9. A. 7 (2/5). L. l. 42–45. L. tr. 9/8.

Length of head $5\frac{1}{4}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{3}$ diameters apart, and also from end of snout. *Barbels*—rather short, the rostral pair being about equal to half the diameter of the orbit, whilst the maxillary are a little longer. Snout somewhat elevated. *Fins*—dorsal spine osseous, smooth, and strong; it is nearly as long as the head, the fin commences somewhat nearer to the end of the snout than to the base of the caudal, and a little in advance of the insertion of the ventral. *Lateral line*—complete, $4\frac{1}{2}$ to 5 rows of scales between it and the base of the ventral fin; 14 rows before the dorsal fin. *Colour*—uniform silvery, with the bases of the scales darkest.

Hab. Bhaváni river at the foot of the Nilgiris.

348. (10.) Barbus micropogon.

Barbus micropogon, *Cuv. & Val. H. N. Poiss.* xvi, p. 188; *Day Fish. India*, p. 563, pl. cxxxvi, fig. 3, and pl. cxxxviii, fig. 4 (see synon.).

Coatee candee, Tamil.

B. iii. D. 13 (4/9). P. 17. V. 10. A. 7–8 (2–3/5). C. 19. L. l. 39–41. L. tr. 6–7/7.

Length of head $4\frac{3}{4}$ to $5\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—in the middle of the length of the head, diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diameters apart and also from end of snout. Snout conically pointed, and adults have pores on the preorbital, and even all across the snout. Cleft of mouth extending about half the distance to below the anterior margin of the orbit. *Barbels*—the rostral extend to below the anterior third of the orbit, the maxillary to below its posterior margin. *Teeth*—pharyngeal, crooked, pointed, 4, 3, 2/2, 3, 4. *Fins*—dorsal commences slightly before insertion of ventrals, and midway between end of the snout and base of caudal fin; its osseous ray is strong, smooth, and somewhat compressed, the stiff portion being slightly longer than the head. Pectoral three fourths as long as the head. Caudal deeply forked. *Lateral line*—complete, but becomes lost in old specimens; 3 to $3\frac{1}{2}$ rows of scales between it and the ventral fin; 15 rows anterior to the dorsal fin. *Colour*—cheeks golden, body with a greenish tinge superiorly, becoming white tinged with gold below the lateral line, the base of each scale somewhat the darkest. Fins darkest along their centres.

Hab. Rivers around the base of the Nilgiris, and Wynaad and South Canara range of hills, also Mysore, attaining a large size. Some were introduced by myself into the Ootacamund lake. The example figured in 'The Fishes of India,' on plate cxxxvi (7·5 inches in length), was from the Wynaad; the specimen on plate cxxxviii (life size) was from the Bhaváni.

349. (11.) Barbus chilinoides.

Barbus cheilynoides, *McClelland, As. Res.* xix, pt. 2, *Ind. Cyp.* pp. 271, 340, pl. 57, fig. 5.
Barbus chilinoides, *Day, Fish, India*, p. 563, pl. cxxxix, fig. 5 (see synon.).

Chit-rah-too, Punj.

B. iii. D. 10–11 (3/7–8). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 32–35. L. tr. $5\frac{1}{2}$/6.

Length of head 5, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in the length of head, $1\frac{1}{4}$ diameters from end of snout, and 2 diameters apart. The snout overhangs the mouth. Some examples have a depression across the snout; numerous fine glands over the cheeks and opercles; lips moderately thick, the lower without a lobe, but with a continuous transverse fold.

Barbels—the rostral and maxillary pairs of about the same length, equal to $1\frac{1}{2}$ diameters of the orbit. *Fins*—dorsal commences about midway between end of snout and base of caudal fin; its last undivided ray is osseous, very strong, entire, the stiff portion being about three fifths of the length of the head. Anal laid flat reaches the base of the caudal, which is deeply forked. *Lateral line*—complete; there are 3 rows of scales between it and the base of the caudal fin. *Colour*—golden above, becoming silvery beneath, the margins of the scales with numerous fine black dots; a black mark behind the opercle. Fins reddish.

Hab. Himalayas, as far to the east as Assam; also found in the Ganges. This fish attains $2\frac{1}{2}$ feet in length.

350. (12.) **Barbus carnaticus.**

Barbus carnaticus, *Jerdon, Mad. Jour. L. S.* xv, 1849, p. 311; *Day, Fish. India*, p. 563, pl. cxxxvii, fig. 3 (see synon.).

Poaree candee, Saal candee, Shellee, Tamil; *Giddi-kaoli*, Hind.; *Gidpakke*, Can.

B. iii. D. 12 (4/8). P. 15. V. 9. A. 7 (2/5). C. 19. L. l. 32. L. tr. 5/6.

Length of head $5\frac{3}{4}$, height of body 3 to 4 in total length. *Eyes*—diameter 3 to 4 in length of head, 1 diameter from end of snout, and $1\frac{1}{2}$ to 2 apart. *Teeth*—pharyngeal, pointed, curved, 5, 3, 2/2, 3, 5. *Barbels*—thin, both pairs shorter than the eye. *Fins*—the dorsal three fourths as high as the body, with a concave upper edge; it commences in front of the insertion of the ventral, and midway between the snout and the base of the caudal fin; its last undivided ray is a strong, broad, smooth spine, nearly as long as the head in the immature, and sometimes longer in the adult, especially in specimens from Canara. Pectoral as long as the head or rather longer. Anal laid flat reaches the caudal. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 12 rows anterior to the dorsal fin. *Colour*—greenish brown along the back, becoming dull white glossed with gold on the sides and beneath. Fins greyish. Eyes golden.

Hab. Rivers along the bases of the Nilgiris, Wynaad, and South Canara hills, attaining at least 25 lbs. in weight. Some have been introduced into the Ootacamund lake.

351. (13.) **Barbus hexagonolepis.**

Barbus hexagonolepis, *McClelland, As. Res.* xix, pt. 2, *Ind. Cyp.* pp. 270, 336, pl. 41, fig. 3; *Day, Fish. India*, p. 564, pl. cxxxvii, fig. 4 (see synon.).

Bokar and *Boolooah*, Assam.

B. iii. D. 12 (3/9). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 28–31. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head 5 to $5\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to 6 in the length of the head, $1\frac{1}{2}$ to 2 diameters from the end of the snout, and $2\frac{1}{2}$ apart. Lower labial fold interrupted. Sometimes pores on the cheeks. *Barbels*—the maxillary reach nearly to below the hind edge of the preopercle, the rostral are shorter. *Fins*—dorsal two thirds as high as the body, it commences somewhat in front of the insertion of the ventral; its last undivided ray is strong, osseous, smooth, with its stiff portion as long as the head excluding the snout. Pectoral as long as the head excluding the snout, and not reaching the ventral. Anal laid flat does not extend to the base of the caudal, which is deeply forked. *Lateral line*—complete, 2 to $2\frac{1}{2}$ rows of scales between it and the ventral; 10 to 11 rows before the dorsal. Exposed portion of scales somewhat hexagonal. *Colour*—deep bluish grey, fins darker.

Hab. Assam in the larger rivers, and in those from the Himalayas. This fish attains upwards of 2 feet in length, and takes a fly or bait freely. McClelland considered *Cyprinus putitora*, Ham. Buch., a variety of this species; it is said to attain 9 feet in length.

352. (14.) Barbus dukai.

Barbus dukai, *Day, Fish. India*, p. 564, pl. cxliii, fig. 3.

B. iii. D. 13 (4/9). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 28–29. L. tr. 4/4.

Length of head $4\frac{3}{4}$ to 5, height of body $4\frac{1}{3}$ to 5 in the total length. *Eyes*—diameter $3\frac{2}{3}$ to 4 in the length of the head, $1\frac{1}{4}$ diameters from the end of snout and $1\frac{1}{3}$ apart. Sides of snout and area below the eye with large open tubercles. *Barbels*—the rostral pair are slightly longer than the orbit, the maxillary almost reach the angle of the preopercle. *Fins*—the dorsal commences a little in advance of the insertion of the ventral; its last undivided ray is strong, osseous, with its stiff portion as long as the head excluding the snout; the fin is three fourths as high as the body below it, having its upper edge very concave. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 9 rows before the dorsal fin. The scales covered with numerous horizontal striæ. *Colour*—of a leaden tinge along the upper portion of the body, becoming dull white shot with gold on the sides and beneath, edges of scales darkest. Fins yellow, with a dark band having a lighter outer edge along the upper and lower edge of the caudal fin.

Hab. Teesta river, Darjeeling, whence Dr. Duka sent me several examples.

353. (15.) Barbus tor. (Fig. 104.)

Cyprinus tor, *Ham. Buch. Fish. Ganges*, p. 305.
Barbus tor, *Day, Fish. India*, p. 564, pl. cxxxvi, fig. 5, and pl. cxl, fig. 1 (see synon.).

Burapatra, Assam; *Poo-meen-candee*, Tam.; *Naharm*, Hind.; *Kukhiah*, Punj.; *Joon-gah*, *Petiah*, and *Kurreah*, Sind; *Khadchi* and *Másta*, Ma-ráthi; *Cooriah*, *Layl-cooriah* or *Lélá*, Ceylon.

B. iii. D. 12 (3/9). P. 19. V. 9. A. 7–8 (2–3/5). L. l. 25–27. L. tr. 4/4.

Length of head 4 to 5, height of body $4\frac{1}{3}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $6\frac{1}{4}$ to $7\frac{1}{2}$ in the length of the head in moderately sized specimens, but much larger in the young (in specimens 3·5 inches long being $3\frac{1}{2}$ in the length of the head; in those 5 inches long $4\frac{1}{2}$), 2 to $2\frac{1}{4}$ diameters from the end of snout, and 2 apart. Lips thick, with an uninterrupted fold across the lower jaw, and with both the upper and lower lips in some specimens produced in the mesial line. *Barbels*—the maxillary pair

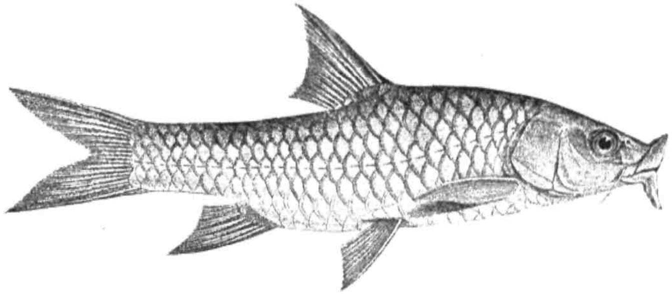

Fig. 104.—*Barbus tor*.

longer than the rostral, and extending to below the last third of the eye. *Fins*—the dorsal arises opposite the ventral, and is three fourths as high as the body; its last undivided ray is smooth, osseous, strong, and of varying length and thickness. Himalayan, Bengal, and Central Indian specimens generally have the spine strong, and from one half to two thirds the length of the head, it rarely exceeds this extent. In Canara, Malabar, and Southern India, where the lips are largely developed, the spine is very much stronger and as long as the head excluding the snout. Pectoral as long as the head excluding the snout; it reaches the ventral, which is little shorter. Anal laid flat does not reach the base of the caudal, which is deeply forked. *Lateral line*—complete, 2 to $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 9 rows before the dorsal. *Colour*—silvery or greenish along the upper half of the body, becoming silvery shot with gold on the sides and beneath. Lower fins reddish yellow.

This fish is the celebrated "Maha seer" (or Mahseer) of sportsmen in India. The various large barbels in Assam are termed "*Petiah*," with a specific name prefixed to denote the species alluded to.

Hab. Generally throughout India, but found of the largest size and in the greatest abundance in mountain-streams or those which are rocky; also found in Ceylon.

354. (16.) Barbus hexastichus.

Barbus hexastichus, *McClelland, As. Res.* xix, pt. 2; *Ind. Cyp.* pp. 269, 333, pl. 39, fig. 2; *Day, Fish. India*, p. 565, pl. cxxxvi, fig. 4 (see synon.).

Lobura, Assam.

B. iii. D. 12-13 (3-4/9). P. 17. V. 9. A. 7 (2/5). C. 19.
L. l. 25-26. L. tr. 4/5.

Length of head 5 to 6, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter one fifth of length of head, $1\frac{1}{2}$ diameters from end of snout, 2 diameters apart. Lips moderately thick, the lower one without or with a badly developed lobe, but having a shallow and continuous transverse fold. Sometimes pores on the cheeks. *Barbels*—longer than the eye. *Fins*—dorsal fin with its osseous ray strong, smooth, and from half as long as the head to as long as the head without the snout, it commences somewhat nearer the snout than the base of the caudal, the latter being deeply forked, with the lower lobe the longer. Pectoral as long as the head excluding the snout. *Lateral line*—complete, 2 to $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 10 rows before the dorsal fin. *Colour*—brownish, tinged with green along the upper edge of the body, becoming dull white shot with yellow on the sides and below; caudal and anal reddish. The fry have a black spot before the base of the caudal fin.

Hab. Rivers on and around Himalayas, Kashmir, Sikhim, and Assam; growing to 3 feet in length. Specimens from the plains appear to have the head comparatively longer than those from the hills.

355. (17.) Barbus bovanicus.

Barbus bovanicus, *Day, Fish. India*, p. 566, pl. cxxxviii, fig. 1.

B. iii. D. 12 (3/9). P. 17. V. 9. A. 8 (3/5). C. 19.
L. l. 24-26. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head $4\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in the length of the head, 1 to $1\frac{1}{4}$ diameters from the end of snout, and $1\frac{2}{3}$ apart. Dorsal profile somewhat more convex than that of the abdomen. Lower labial fold in the adult complete, with a moderately developed median lobe, which is not apparent in the young. *Barbels*—rostral pair extend to beneath the first third of the eye, the maxillary pair to the posterior edge of the preopercle. *Fins*—dorsal two thirds as high as the

body, with a concave upper edge, it commences in front of the ventrals; its last undivided ray is osseous, of moderate strength, its stiff portion being as long as the head excluding the snout. Pectoral as long as the head posterior to the nostrils and longer than the ventral. Anal laid flat reaches the caudal. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 10 rows before the dorsal fin. *Colour*—greenish, with a golden tinge, darkest along the back.

Hab. Bhaváni (Bowany) river, at base of Nilgiri hills in Madras. The largest specimen obtained was 5 inches in length.

356. (18.) Barbus sophore.

Cyprinus sophore, *Ham. Buch. Fish. Ganges*, pp. 310, 389 (part), (pl. 19, fig. 86 is not the same species).

Barbus sophore, *Day, Fish. India*, p. 566, pl. cxliii, fig. 4 (see synon.).

B. iii D. 12 (3/9). P. 15. V. 9. A. 7 (2/5).
L. l. 25. L. tr. $3\frac{1}{2}/4\frac{1}{2}$.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—3 to $3\frac{1}{4}$ in the length of the head, nearly 1 diameter from end of snout, and also apart. *Barbels*—long and thin, the maxillary pair one half longer than the eye; the rostral pair slightly shorter. *Fins*—dorsal ray weak, osseous, entire, and as long as the head without the snout; the fin arises slightly before the ventral, and midway between the end of the snout and the root of the caudal. *Lateral line*—complete, $2\frac{1}{2}$ rows between it and the base of the ventral; 9 rows before the dorsal fin. *Scales*—with numerous longitudinal striæ. *Colour*—silvery, with a lateral blotch.

Hab. Assam and Khasi hills.

357. (19.) Barbus stracheyi.

Barbus (Barbodes) stracheyi, *Day, J. A. S. B.* xl, 1871, p. 307.

Barbus stracheyi, *Day, Fish. India*, p. 566, pl. cxxxix, fig. 4 (see synon.).

B. iii. D. 11 (2/9). P. 17. V. 9. A. 7 (2/5). C. 17.
L. l. 23. L. tr. $3\frac{1}{2}/5$.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ diameters from end of snout, $2\frac{1}{2}$ diameters apart. Mouth without enlarged lips; lower labial fold interrupted. *Barbels*—long, the rostral pair reaching to below the centre of the orbit, and the maxillary pair to beneath its posterior margin. *Fins*—dorsal osseous ray strong, smooth, and as long as the head without the snout, the fin commences midway between the end of the snout and the base of the caudal fin. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fins. *Colour*—uniform silvery.

Hab. Akyab and Moulmein.

358. (20.) Barbus curmuca.

Cyprinus curmuca, *Buchanan's Journey in Mysore*, iii, p. 344, pl. xxx.
Barbus curmuca, *Day, Fish. India*, p. 566, pl. cxli, fig. 1 (see synon.).

B. iii. D. 12 (3/9). P. 16. V. 9. A. 8 (3/5). C. 18.
L. l. 41. L. tr. 8/7.

Length of head 5, height of body 5 in the total length. *Eyes*—diameter $4\frac{1}{3}$ in the length of the head, $1\frac{1}{2}$ diameters from the end of the snout, and also apart. Snout conical, head compressed, interorbital space transversely concave. Dorsal profile more convex than that of the abdomen. In adults there is a band of open pores from the preorbital along the cheek. *Barbels*—two maxillary pairs, the lower as long as the eye, the upper half as long. *Fins*—dorsal as high as the body, its upper edge concave, it arises in front of the insertion of the ventral, its last undivided ray weak and articulated. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 10 rows anterior to the dorsal fin. Caudal deeply forked, its lobes pointed. *Colour*—silvery, lightest on the sides and beneath; tips of the caudal blackish. In the young the middle third of the caudal is orange, and it is tipped with black.

Hab. Western Ghats of India; attaining to at least 4 feet in length.

359. (21.) Barbus lithopidos.

Barbus (Barbodes) lithopidos, *Day, P. Z. S.* 1873, p. 708.
Barbus lithopidos, *Day, Fish. India*, p. 567, pl. cxxxviii, fig. 2.

Kuri meen, Canarese.

B. iii. D. 12 (3/9). P. 15. V. 10. A. 8 (3/5). C. 19.
L. l. 38–39. L. tr. 7/7.

Length of head $5\frac{3}{4}$ to $6\frac{1}{3}$, height of body $4\frac{3}{4}$ in the total length. *Eyes*—$3\frac{3}{4}$ to $4\frac{1}{4}$ diameters in length of head, 1 to $1\frac{1}{2}$ diameters from end of snout, and $1\frac{1}{3}$ apart. Body compressed, dorsal and abdominal profiles equally and moderately convex. Lower labial fold interrupted; a thin cartilaginous covering internally to either jaw. Large examples have pores on the preorbital. *Barbels*—both pairs thin, and about as long as the orbit. *Fins*—dorsal high in front, equalling the height of the body, its upper edge concave, its origin anterior to the insertion of the ventral, its last undivided ray weak and articulated. Pectoral and ventral of equal length, and as long as the head. Caudal very deeply forked. *Lateral line*—complete, 4 rows of scales between it and base of ventral fin; 14 rows before the dorsal. Free portion of the tail as high at its base as it is long. *Colour*—slaty, as are the fins, having their outer rays whitish. Pectoral yellowish, tail greenish. Adults are more yellow, with a grey band behind the opercle, and some of the scales scarlet.

Hab. South Canara, where it is not uncommon in the rivers, and attains 2 feet in length.

360. (22.) **Barbus thomassi.**

Barbus (Barbodes) thomassi, *Day, P. Z. S.* 1873, p. 707.
Barbus thomassi, *Day, Fish. India*, p. 567, pl. cxxxvii, fig. 5 (see synon.).

Kem-pu-per-ru-wul, Canarese (Red Mahaseer).

B. iii. D. 12–13 (3–4/9). P. 17. V. 10. A. 8 (3/5). C. 19. L. l. 31–34. L. tr. 6/6.

Length of head $5\frac{3}{4}$ to $6\frac{1}{4}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—high up, diameter $3\frac{3}{4}$ to 4 in length of head, $1\frac{1}{2}$ diameters from end of snout, and also apart. Dorsal profile about equally convex with that of the abdomen. Lower labial fold interrupted. *Barbels*—thin, the maxillary not so long as the eye, the rostral pair shorter. *Fins*—dorsal high anteriorly, equalling the height of the body; its origin is anterior to the insertion of the ventral; its upper edge very concave, and its last undivided ray weak and articulated. Pectoral and ventral of equal length, and four fifths as long as the head; caudal deeply forked, the upper lobe the longer. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 12 rows anterior to the dorsal. *Colour*—silvery along the back, each scale with a red lunule; dorsal and caudal fins lake-colour, the last being usually edged with black. Ventral and anal also lake-colour, stained with greyish-black. Most of the scales with a dark base.

Hab. South Canara; attaining at least $3\frac{1}{2}$ feet in length.

361. (23.) **Barbus spinulosus.**

Barbus spinulosus, *McClelland, Cal. Journ. N. H.* v, p. 280, pl. 21, fig. 3; *Day, Fish. India*, p. 567 (see synon.).

B. iii. D. 12 (3/9). P. 15. V. 9. A. 10 (3/7). C. 19. L. l. 32.

Length of head 5, height of body $4\frac{1}{2}$ in the total length. Back a little elevated. *Eyes*—before the middle of the length of the head. Dorsal profile but slightly arched. Snout short. *Fins*—dorsal without osseous ray, commencing midway between the end of the snout and the base of the caudal. *Colour*—greenish above, white below; fins pale.

Hab. Sikhim, whence a single specimen, 7 inches long, was obtained by McClelland.

362. (24.) **Barbus pulchellus.**

Barbus (Barbodes) pulchellus, *Day, P. Z. S.* 1870, p. 372.
Barbus pulchellus, *Day, Fish. India*, p. 568, pl. cxl, fig. 3 (see synon.).

Khatladi, Canarese; *Tulu*, Mal.; *Khudia*, Maráthi.

B. iii. D. 12 (3/9). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 30–32. L. tr. 5–6/$5\frac{1}{2}$.

Length of head 6 to $6\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ diameters from the end of the snout, and $1\frac{3}{4}$ apart. Pores on the snout. *Barbels*—four, the maxillary pair being the longest, equalling one third of

the length of the head. *Teeth*—pharyngeal, crooked, pointed, 4, 3, 2/2, 3, 4. *Fins*—dorsal arises slightly before the ventral; its upper border is concave, it is two thirds the height of the body, having its last undivided ray weak, smooth, and articulated. Caudal deeply forked. *Scales*—$3\frac{1}{2}$ rows between the lateral line and the base of the ventral fin. *Colour*—all the scales above a line going direct from the eye to centre of the caudal fin are deep grey, with dark bases; below all are silvery grey; fins with dark edges.

Hab. South Canara, frequenting the inland streams, attaining at least $17\frac{1}{2}$ inches in length.

363. (25.) **Barbus dobsoni.**

Barbus (Barbodes) dobsoni, *Day, Jour. L. S., Zool.* xii, 1876, p. 574.
Barbus dobsoni, *Day, Fish. India*, p. 568, pl. cxxxix, fig. 6.

B. iii. D. 12–13 (3–4/9). P. 14. V. 9. A. 8 (3/5). C. 19.
L. l. 30–32. L. tr. $5\frac{1}{2}$–$6/5\frac{1}{2}$.

Length of head 6, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in the length of the head, nearly 1 diameter from end of snout, and $1\frac{1}{2}$ apart. Snout a little obtuse. Mouth narrow. Lower labial fold interrupted. *Barbels*—thin, the maxillary as long as the eye, the rostral somewhat shorter. *Teeth*—pharyngeal, crooked and pointed, 5, 3, 2/2, 3, 5. *Fins*—dorsal commences somewhat in advance of the insertion of the ventral; it is about two thirds as high as the body, its last undivided ray articulated and smooth. Pectoral as long as the head. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the ventral fin; 12 rows anterior to the dorsal. *Colour*—bluish above, becoming lighter on the sides and beneath; fins edged with grey, upper corner of dorsal and ends of caudal blackish.

Hab. Deccan.

364. (26.) **Barbus jerdoni.**

Barbus (Barbodes) jerdoni, *Day, P. Z. S.* 1870, p. 372.
Barbus jerdoni, *Day, Fish. India*, p. 568, pl. cxxxviii, fig. 5.

Say-meen, Can.; *Cha-meen*, Tel.; *Ta-meen*, Mal.

B. iii. D. 12 (3/9). P. 15. V. 9. A. 8 (3/5). C. 19.
L. l. 27–28. L. tr. 6/4.

Length of head 5 to $5\frac{1}{4}$, height of body 4 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 to $1\frac{1}{2}$ diameters from end of snout, and $1\frac{1}{2}$ apart. A considerable rise to the commencement of the dorsal fin. Mouth narrow. Lower labial fold interrupted. *Barbels*—thin, the maxillary as long as the orbit, the rostral slightly shorter. *Fins*—last undivided dorsal ray articulated, weak and not enlarged; the fin, which is four fifths as high as the body below it, commences midway between the snout and the base of the caudal. Pectoral as long as the head and nearly reaching the ventral, which is of the same length.

Anal laid flat reaches somewhat beyond the root of the caudal fin, which is deeply forked. *Lateral line*—complete, rather concave: $2\frac{1}{2}$ to $3\frac{1}{2}$ rows of scales between it and the base of the ventral; 12 rows before the dorsal fin. *Colour*—silvery; the fins have an orange tint, tipped with black.

Hab. Rivers in Canara below the Ghats, attaining at least 18 inches in length.

365. (27.) Barbus wynaadensis.

Barbus (Barbodes) wynaadensis, *Day, Jour. L. S., Zool.* xi, 1873, p. 528.

Barbus wynaadensis, *Day, Fish. India*, p. 568, pl. cxxxviii, fig. 3, and pl. cxxxix, fig. 2.

B. iii. D. 13 (4/9). P. 17. V. 9. A. 8 (3/5). C. 19. L. l. 26–28. L. tr. 4/6.

Length of head $4\frac{3}{4}$ to 5, height of body $4\frac{1}{4}$ to 5 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ to 2 diameters from end of snout, and $1\frac{3}{4}$ apart. Snout conical. Lower labial fold interrupted. *Barbels*—the maxillary pair as long as the orbit or longer, the rostral one fourth shorter. *Fins*—the dorsal two thirds as high as the body, its origin a little anterior to the insertion of the ventral; its last undivided ray weak, osseous, with an articulated extremity. *Lateral line*—complete, $2\frac{1}{2}$ to 3 rows of scales between it and the base of the ventral fin: 10 rows before the dorsal fin. *Colour*—leaden silvery along the back, with a dark band running from behind the eye to the middle of the base of the caudal fin, where it sometimes ends in a round black blotch. Abdomen of a light orange colour. Fins stained with grey at their edges.

Hab. Vithry in the Wynaad, where it is common in the larger streams, attaining at least 8 inches in length.

366. (28.) Barbus stevensonii.

Barbus (Barbodes) stevensonii, *Day, P. Z. S.* 1870, p. 100.

Barbus stevensonii, *Day, Fish. India*, p. 569, pl. cxxxv, fig. 6.

B. iii. D. 12 (3/9). P. 17. V. 9. A. 8 (3/5). C. 19. L. l. 27. L. tr. $4\frac{1}{2}$/5.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter two sevenths of length of head, 1 diameter from end of snout and apart. Body elongated and compressed. Lower labial fold interrupted. *Barbels*—the maxillary extend to below the posterior extremity of the orbit; the rostral are shorter. *Fins*—dorsal with a smooth, weak, osseous ray, as long as the head excluding the snout; its height is rather less than that of the body, and it arises slightly in advance of the ventrals. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin, and 9 before the dorsal fin. *Colour*—silvery, upper portion of body darker; numerous black specks along the side; a black spot at the base of the caudal, and a dark band along the dorsal fin.

Hab. Hills near Akyab.

367. (29.) Barbus neilli.

Barbus neilli, *Day, P. Z. S.* 1868, p. 581; *and Fish. India*, p. 569, pl. cxl, fig. 4 (see synon.).

B. iii. D. 13 (4/9). P. 15. V. 10. A. 8 (3/5). C. 19. L. l. 24–26. L. tr. $4\frac{1}{2}/4$.

Length of head $4\frac{1}{2}$ to 5, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{2}$ diameters from end of snout and also apart. Dorsal and abdominal profiles about equally convex. Snout conical. Lower labial fold continuous. *Barbels*—the rostral pair reach the front edge of the eye, the maxillary pair equal $1\frac{1}{2}$ diameters of the orbit. *Teeth*—pharyngeal, curved, 5, 3, 2/2, 3, 5. *Fins*—origin of dorsal anterior to the insertion of the ventral; the fin is two thirds as high as the body, its upper edge concave, its last undivided ray osseous, entire, and very weak. Pectoral as long as the head excluding the snout, and longer than the ventral. Anal laid flat reaches the base of the caudal, which is forked. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the ventral fin; 9 rows anterior to the dorsal. *Colour*—silvery above the lateral line, with a tinge of yellow below it. Fins with a bluish tinge in some specimens, reddish in others. The young have a dark spot at the base of the caudal fin. Eyes golden.

Hab. Kurnool on the Tungabhadra river. The largest specimen seen by myself was 38 lbs. in weight, but this species is said to attain to 50 or 60 lbs.

368. (30.) Barbus malabaricus.

Barbus malabaricus, *Jerdon, Mad. Jour. L. S.* xv, 1849, p. 312; *Day, Fish. India*, p. 569, pl. cxxxviii, fig. 6.

B. iii. D. 12–13 (3–4/9). P. 17. V. 9. A. 8 (3/5). C. 19. L. l. 24. L. tr. 4/4.

Length of head $4\frac{2}{3}$ to 5, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—diameter 5 in length of head, $1\frac{2}{3}$ diameters from end of snout, and 2 apart. Dorsal and abdominal profiles about equally and moderately convex: lower labial fold complete, and with a median lobe. *Barbels*—the maxillary pair reach to below hind edge of eye; the rostral pair are shorter. *Fins*—dorsal two thirds as high as the body; its origin is anterior to the insertion of the ventral; its upper edge concave, its last undivided ray osseous, weak, with its bony portion equalling the postorbital length of the head. *Lateral line*—complete, $1\frac{1}{2}$ rows of scales between it and the ventral fin; 9 rows anterior to the dorsal. *Colour*—bluish, becoming white on the abdomen. Fins usually blue. Eyes red. Sometimes the fish is brown; and the dorsal, pectoral, and ventral red; or the front edge of the dorsal and anal and upper and lower borders of the caudal may be dark.

Hab. From South Canara down the Western Ghats to the Travancore hills; attaining at least 18 inches in length.

369. (31.) Barbus innominatus.

Barbus (Barbodes) innominatus, *Day, P. Z. S.* 1869, p. 556.
Barbus innominatus, *Day, Fish. India*, p. 570 (see synon.).

B. iii. D. 12 (3/9). P. 15. V. 9. A. 7 (2/5). C. 17. L. l. 24. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diameter from end of snout and also apart. *Barbels*—the rostral nearly reach the orbit, the maxillary pair are shorter. *Fins*—dorsal commences midway between the snout and the base of the caudal; its last undivided ray osseous, weak, and entire. Caudal forked. *Scales*—3 rows between lateral line and base of ventral fin. *Colour*—a black spot at the base of the caudal fin; none now apparent on the dorsal.

Hab. Ceylon, whence Mr. Blyth received specimens up to 1·1 inches in length.

370. (32.) Barbus compressus.

Barbus (Barbodes) compressus, *Day, P. Z. S.* 1869, p. 555.
Barbus compressus, *Day, Fish. India*, p. 570.

B. iii. D. 12 (3/9). P. 15. V. 9. A. 8 (3/5). C. 17. L. l. 22. L. tr. 4/5.

Length of head 5, height of body 4 in the total length. *Eyes*—diameter two ninths of length of head, $1\frac{1}{2}$ diameters from end of snout, and also apart. Head much compressed: the whole of the cheeks covered with pores. *Barbels*—the rostral reaches to beneath the centre of the orbit, the maxillary to the angle of the propercle. *Fins*—dorsal half as high as the body; it arises midway between the snout and the base of the caudal, commencing slightly in advance of the ventrals; its last undivided ray is osseous, not enlarged, and entire. Upper caudal lobe the longer. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin. *Colour*—silvery, fins stained darker.

Hab. The native country of the type specimen is uncertain, but the fish was found in a bottle in the Calcutta Museum with an *Oreinus* labelled as from Kashmir.

371. (33.) Barbus blythii.

Barbus (Barbodes) blythii, *Day, P. Z. S.* 1869, p. 555.
Barbus blythii, *Day, Fish. India*, p. 570 (see synon.).

B. iii. D. 12 (3/9). P. 15. V. 9. A. 8 (3/5). C. 17. L. l. 22. L. tr. 4/5.

Length of head 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter two fifths of length of head, three fourths of a diameter from the end of snout, and also apart. Preorbital covered with pores. *Barbels*—well developed, the rostral reaching the eye, and the maxillary to below the centre of the orbit.

Fins—dorsal arises midway between the snout and the base of the caudal, its last undivided ray articulated: it commences slightly in advance of the ventrals. Caudal deeply forked. *Lateral line*—complete, $2\frac{1}{2}$ rows between it and the base of the ventral fin. *Colour*—uniform silvery in spirit.

Hab. Tenasserim provinces. Specimen 2 inches long.

372. (34.) Barbus melanampyx.

Labeo melanampyx, *Day, P. Z. S.* 1865, p. 298.
Barbus melanampyx, *Day, Fish. India*, p. 570, pl. cxxxix, fig. 1 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 8. A. 7 (2/5). C. 15. L. l. 20. L. tr. $3\frac{1}{2}/3\frac{1}{2}$.

Length of head $4\frac{1}{2}$, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, from $\frac{3}{4}$ to 1 diameter from end of snout, 1 diameter apart. Numerous pores on the snout. Lower labial fold interrupted. *Barbels*—rostral short, the maxillary equal in length to one diameter of the orbit. *Teeth*—pharyngeal, in three rows, curved, sharp, 5, 3, 2/2, 3, 5. *Fins*—dorsal scarcely higher than long, no osseous ray; it commences midway between the end of the snout and the base of the caudal fin, which latter is deeply forked. *Lateral line*—complete, 2 rows of scales between it and the base of the ventral fin; 7 rows before the dorsal fin. *Colour*—of a deep dull red, with three black cross bands, the first from below the whole of the base of the dorsal to just beneath the lateral line, the second commences four scales beyond the posterior extremity of the base of the dorsal and descends to one scale below the lateral line, whilst the last is just before the base of the caudal and often wanting. Fins pinkish, edged with black.

Hab. The Wynaad, Nilgiri and Travancore ranges of hills and streams along their bases; also the Cauvery river. This fish rarely attains 3 inches in length.

B. With two barbels (*Capoëta*).

373. (35.) Barbus macrolepidotus.

Capoëta macrolepidota, *Cuv. & Val. H. N. Poiss.* xvi, p. 280, pl. 477.
Barbus macrolepidotus, *Day, Fish. India*, p. 571, pl. cxlii, fig. 1 (see synon.).

B. iii. D. 12 (4/8). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 26. L. tr. 5/5.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 5 to $5\frac{1}{4}$ in length of head, $1\frac{1}{2}$ diameters from end of snout and also apart. Snout pointed, without pores; head compressed. *Barbels*—the maxillary as long as the orbit. *Fins*—dorsal commences slightly nearer the snout than the base of the caudal, and opposite the insertion of the ventrals, its last undivided

ray is weak (scarcely osseous), and finely serrated in nearly its whole extent. Caudal deeply forked. *Scales*—$2\frac{1}{2}$ rows between lateral line and base of ventral fin; 10 rows before the dorsal fin. *Colour*—silvery, lightest on the sides and below; fins orange, anterior edge of the dorsal and outer margins of the caudal black. A badly developed darkish band from the dorsal to the ventral fin.

Hab. Tavoy to the Malay Peninsula.

374. (36.) Barbus chola.

Cyprinus chola, *Ham. Buch. Fish. Ganges*, pp. 312, 389.
Barbus chola, *Day, Fish. India*, p. 571, pl. cxlii, fig. 4 (see synon.).

Koroon, Tam.; *Kerrundi*, Beng.; *Nga-khon-ma* and *Nga-lowah*, Burmese; *Pittha-kerrundi*, "bitter carp," Ooriah; *Chaddu paddaka*, Tel.; *Katcha karawa*, Hind.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 26–28. L. tr. $5\frac{1}{2}$/5.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body $3\frac{1}{4}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in the length of the head, $\frac{3}{4}$ to 1 diameter from end of snout, and $1\frac{1}{4}$ apart. Suborbital ring of bones narrow, their depth not being one third of that of the uncovered portion of the cheek. *Barbels*—a single maxillary pair not so long as one diameter of the orbit. *Fins*—dorsal three fifths as high as the body, it commences opposite the ventrals and midway between the end of the snout and the base of the caudal fin, its last undivided ray is osseous and smooth, with the stiff portion moderately strong and as long as the head excluding the snout. *Lateral line*—complete, from 3 to $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 10 to 12 rows before the dorsal fin. *Colour*—silvery, opercles shot with purple and gold. A dark blotch is usually present on the side of the free portion of the tail from the 23rd to the 25th scales of the lateral line; in some Malabar examples this blotch is intensely black. A dark mark along the base of the anterior dorsal ray, and a row of dark spots along its centre. Occasionally there is a dark mark behind the gill-opening, especially in Bengal and Assam examples.

Hab. From Malabar and the Wynaad, through Madras, Orissa, the Punjab, Bengal, and Gangetic Provinces, the Central Provinces, Assam, also Akyab and Burma to Mergui. This fish grows to about 5 inches in length. As food it is bitter; in some localities in Burma oil is obtained from it during the breeding-season.

375. (37.) Barbus parrah.

Puntius parrah, *Day, P. Z. S.* 1865, p. 301.
Barbus parrah, *Day, Fish. India*, p. 572, pl. cxlii, fig. 3 (see synon.).

Parrah perlee, Mal.; *Kutcha karawa*, Hind.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19.
L. l. 25–26. L. tr. 5/5.

Length of head 5, height of body $3\frac{3}{4}$ to 4 in the total length.

length. *Eyes*—upper margin near the profile, diameter $3\frac{3}{4}$ to 4 in the length of the head, $1\frac{1}{4}$ diameters from end of snout and also apart. Body compressed, a considerable rise in the profile from the occiput to the dorsal fin. *Barbels*—extend rather beyond the middle of the eye. *Teeth*—pharyngeal, pointed, uncinate, 5, 3, 2/2, 3, 5. *Fins*—the dorsal three fourths as high as the body, inserted in advance of the ventral. Caudal deeply forked. *Lateral line*—complete, 4 or 5 rows of scales between it and the base of the ventral fin. *Colour*—silvery, with a tinge of yellow; dorsal, caudal, and anal tipped with grey.

Hab. Central Provinces, Deccan, and throughout the Kistna, Tungabhadra, and Godávari rivers; attaining upwards of a foot in length.

380. (42.) Barbus denisonii.

Labeo denisonii, *Day, P. Z. S.* 1865, p. 299.
Barbus denisonii, *Day, Fish. India*, p. 573, pl. cxliii, fig. 2 (see synon.).

B. iii. D. 10–11 (2–3/8). P. 15. V. 9. A. 8 (3/5). C. 19.
L. l. 28. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head 6, height of body 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout, and $1\frac{1}{2}$ apart. Dorsal and abdominal profiles slightly and about equally convex. Snout obtuse. *Barbels*—a maxillary pair one third longer than the orbit. *Teeth*—pharyngeal, pointed and curved at their extremities, 4, 3, 2/2, 3, 4. *Fins*—dorsal arises rather before the ventrals, none of its rays osseous. Caudal deeply forked. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and ventral fin; 9 rows before dorsal fin. *Colour*—silvery, with a black band, above which runs a horizontal scarlet stripe passing from the snout to the centre of the base of the caudal fin. Caudal with an oblique black band crossing the posterior third of each lobe.

Hab. Mundikyum in the Travancore hill-ranges. This fish attains 6 inches in length.

381. (43.) Barbus melanostigma.

Barbus melanostigma, *Day, Fish. India*, p. 573, pl. cxliii, fig. 1 (see synon.).

B. iii. D. 10 (2/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 26. L. tr. 5/4.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ in length of head, 1 diameter from end of snout, and $1\frac{1}{2}$ apart. Mouth narrow; lower labial fold interrupted. Third suborbital bone as deep as the uncovered portion of the cheek below it or rather deeper. *Barbels*—a maxillary pair about half as long as the orbit. *Fins*—dorsal three fourths as high as the body, having a concave upper edge, commencing rather in advance of the insertion of the ventral; last

undivided dorsal ray very weak, osseous inferiorly, and articulated in its upper half. Caudal deeply forked. *Lateral line*—complete, very slightly concave; 3 rows of scales between it and the base of the ventral fin; 8 rows before the dorsal. *Colour*—silvery above, becoming white on the sides and beneath, a light band along the side; a deep black blotch on the side of the tail, commencing on the twenty-first or twenty-second scale; dorsal and caudal stained with grey, sometimes a dark band along the side.

Hab. Wynaad hills in Malabar. Jerdon also obtained specimens in the Bhaváni river and from the Cauvery.

382. (44.) Barbus arenatus.

Barbus arenatus, *Day, Fish. India*, p. 574, pl. cxlii, fig. 7.

B. iii. D. 10 (2/8). P. 15. V. 9. A. 8 (3/5). C. 19.
L. l. 26. L. tr. 4/6.

Length of head $4\frac{3}{4}$, height of body 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in the length of the head, $1\frac{1}{2}$ diameters from end of snout, and 2 apart. Suborbital ring of bones very narrow Body thick, its width equalling four sevenths of its height. *Barbels*—a single maxillary pair which reaches to beneath the first third of the eye. No pores on the head. *Fins*—last undivided dorsal ray fine, smooth, osseous inferiorly, becoming articulated superiorly; the fin commences before the insertion of the ventral. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 11 rows anterior to the dorsal fin. *Colour*—silvery, without any markings. In some examples a darkish band along the dorsal fin.

Hab. Madras.

383. (45.) Barbus puckelli.

Puntius (Capoëta) puckelli, *Day, P. Z. S.* 1868, p. 197.
Barbus puckelli, *Day, Fish. India*, p. 574, pl. cxliii, fig. 5.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 8 (3/5). C. 19.
L. l. 24. L. tr. 4/5.

Length of head $5\frac{1}{4}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, two thirds of a diameter from end of snout, and $1\frac{1}{2}$ diameters apart. No pores on the head, its summit rather convex. *Barbels*—a thick maxillary pair, reaching to beneath the anterior edge of the eye. *Teeth*—pharyngeal, plough-shaped, 5, 3, 2/2, 3, 5. *Fins*—last undivided dorsal ray weak and cartilaginous, the fin commences before the ventral. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 10 rows before the base of the dorsal fin. *Colour*—greenish yellow along the back, with a red mark on the opercle, and a scarlet stripe extending along the middle of the side. A deep black mark on the dorsal fin from the base of the

third to that of the sixth branched ray. Very fine dark spots over the scales, especially at their bases. An indistinct black mark on the lateral line from the nineteenth to the twenty-first scale.

Hab. Bangalore, where it is said to be common.

384. (46.) Barbus amphibius.

Capoëta amphibia, *Cuv. & Val. H. N. Poiss.* xvi, p. 282, pl. 478.
Barbus amphibius, *Day, Fish. India*, p. 574, pl. cxlii, fig. 8 (see synon.).

Oolee perlee, Mal.; *Bhondgi*, Maráthi.

B. iii. D. 10–11 (2–3/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 23–24. L. tr. 5/4.

Length of head $4\frac{3}{4}$ to 5, height of body $4\frac{1}{4}$ to 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout, and $1\frac{1}{4}$ apart. *Barbels*—a thin maxillary pair reaching to below the centre of the eye. *Fins*—the dorsal two thirds as high as the body, with its osseous ray feeble, smooth, and half as long as the head; the fin arises somewhat in advance of the ventrals. Caudal fin deeply forked. *Lateral line*—complete, 2 rows of scales between it and the base of the ventral fin; 8 rows before the dorsal. *Colour*—upper half of body steel-blue, becoming white tinged with golden on the sides and beneath. Sometimes a dark band along the side, and a black spot on either side of the tail anterior to the caudal fin, this becomes indistinct after specimens have been long macerated, but is very apparent in fresh ones, especially those from the Malabar coast; it is not well-marked, and often absent, in those taken in Bombay. Fins yellowish, upper edge of dorsal usually stained with black. In the monsoon time a crimson band along the sides is sometimes present.

Hab. Central India, Deccan, Bombay, and the Western coast of India, Madras and up the coast as high as Orissa; attaining to at least 6 inches in length.

385. (47.) Barbus arulius.

Systomus arulius, *Jerdon, Mad. Jour. L. S.* xv, 1849, p. 317.
Barbus arulius, *Day, Fish. India*, p. 575, pl. cxlii, fig. 5 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 18.
L. l. 21–23. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head $4\frac{1}{2}$ to 5, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of the head, 1 diameter from end of snout and also apart. *Barbels*—a long maxillary pair. *Teeth*—pharyngeal, 5, 3, 2/2, 3, 5, sharp and curved at their extremities. *Fins*—no osseous dorsal ray; the fin, which is two thirds as high as the body, commences midway between the end of the snout and the base of the caudal, which last is deeply emarginate. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 9 rows before the base of the dorsal fin. *Colour*—olive-green on the back, becoming silvery

white dashed with reddish green over the abdomen. A black blotch, about two scales in width, passes from below the origin of the dorsal fin as low as the lateral line; a second from just below the posterior extremity of the dorsal to the base of the anal; and a third across the free portion of the tail before the caudal fin. Dorsal, caudal, and anal pinkish with a black bar across the summit of the first, whilst the caudal is stained at its edges.

Hab. Wynaad and Nilgiri range of hills and the rivers at their bases, and at least as far south as Kotayam in Travancore; also in the Cauvery, from whence this fish has been procured at Seringapatam, where it is termed *Aruli.* It attains 4 inches or more in length.

386. (48.) Barbus mahecola. (Fig. 105.)

Leuciscus mahecola, *Cuv. & Val. H. N. Poiss.* xvii, p. 305, pl. 502 (barbels omitted).

Barbus mahecola, *Day, Fish. India*, p 575, pl. cxl, fig. 5 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 21. L. tr. 5/4.

Length of head $4\frac{3}{4}$ to 5, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of head, 1 diameter from end of snout, $1\frac{1}{2}$ diameters apart. In some specimens the snout is covered with large pores. *Barbels*—a thin maxillary pair extending

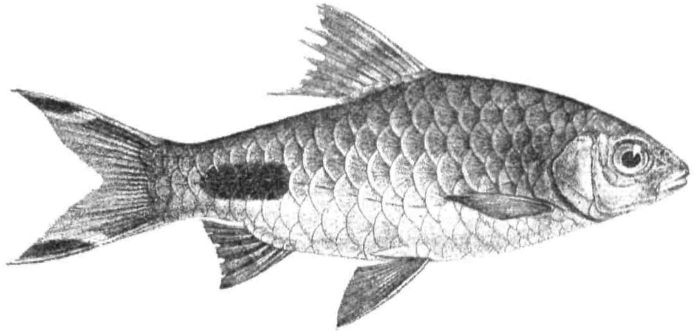

Fig. 105.—*Barbus mahecola.*

to below the centre of the orbit in some specimens, very minute in others (see remarks, p. 294). *Fins*—last undivided dorsal ray articulated, smooth, feeble; the branched rays are elongate in the adult; the fin commences midway between the snout and the base of the caudal fin. Caudal deeply lobed. *Lateral line*—complete, $2\frac{1}{2}$ rows of scales between it and the base of the ventral. *Colour*—silvery white, with a deep black oval mark on the lateral line from about the fourteenth to the eighteenth scale. A dark band along the dorsal fin. Caudal red, tipped with black.

Hab. From Canara down the Western coast and along the base of the Nilgiris, and Travancore hills, also Ceylon; attaining at least 6 inches in length.

C. Without barbels (*Puntius*).

387. (49.) Barbus apogon.

Barbus apogon, (*Kuhl*) *Cuv. & Val. H. N. Poiss.* xvi, p. 392; *Day, Fish. India*, p. 575, pl. cxli, fig. 3 (see synon.).

Nga-ta-zee and *Nga-lay-toun*, Burmese.

B. iii. D. 12 (4/8). P. 17. V. 10. A. 8 (3/5). C. 19.
L. l. 36–37. L. tr. $7\frac{1}{2}$/7.

Length of head $5\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in the length of the head, 1 to $1\frac{1}{4}$ diameters from the end of snout and also apart. Body strongly compressed, and rising abruptly from the nape to the base of the dorsal fin. *Fins*—dorsal arises rather behind the insertion of the ventral, its last undivided ray strong, serrated, and the stiff portion rather shorter than the head. First three anal rays rather stiff. Caudal deeply forked. *Lateral line*—complete, $5\frac{1}{2}$ (4 in some specimens) rows of scales between it and the ventral fin; 15 rows of scales before the base of the dorsal fin. *Colour*—silvery, each scale with a dark spot at its base.

Hab. Tenasserim and throughout Burma (certainly as high as Mandalay) to the Malay Archipelago; attaining at least 8 inches in length.

388. (50.) Barbus ambassis.

Barbus ambassis, *Day, P. Z. S.* 1868, p. 583, *and Fish. India*, p. 576, pl. cxlv, fig. 1.

Bunkuai, Ooriah.

B. iii. D. 11 (3/8). P. 11. V. 9. A. 7 (2/5). C. 19.
L. l. 36. L. tr. 6/8.

Length of head 5 to $5\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter nearly two fifths of length of head, $\frac{1}{2}$ diameter from end of snout, 1 diameter apart. *Teeth*—pharyngeal, sharp, crooked, 5, 3, 2/2, 3, 5. *Fins*—dorsal spine osseous, strong, and posteriorly serrated, having about 15 teeth; the fin commences slightly before the ventral, and midway between the end of the snout and the base of the caudal, which last is deeply lobed. *Scales*—small and deciduous. *Lateral line*—incomplete, becoming indistinct in the posterior two thirds of the body, 6 rows of scales between it and the base of the ventral fin; 15 rows before the dorsal fin. *Colour*—light greenish, with a silvery band along the side. A small black spot at the base of the anterior dorsal rays, and a black blotch at the side of the tail.

Hab. Madras, Orissa, Bengal, and Assam at least as high as Sadiya; attaining about 3 inches in length.

389. (51.) Barbus conchonius.

Cyprinus conchonius, *Ham. Buch. Fish. Ganges*, pp. 317, 389.
Barbus conchonius, *Day, Fish. India*, p. 576, pl. cxliii, fig. 7 (see synon.).

Kunchon pungti, Bengali.

B. iii. D. 11 (3/8). P. 11. V. 9. A. 7 (2/5). C. 19.
L. l. 24–26. L. tr. $5\frac{1}{2}/6\frac{1}{2}$.

Length of head 5, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter one third of length of head, nearly 1 diameter from end of snout, and $1\frac{1}{4}$ apart. *Fins*—the dorsal three fifths as high as the body, its last undivided ray osseous, moderately strong and serrated, as long as the head without the snout; the fin commences rather before the insertion of the ventral. *Lateral line*—incomplete, ceasing after 8 or 10 scales; 4 to $4\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 9 rows before dorsal fin. *Colour*—a large round black spot on the middle of the side above the posterior portion of the anal fin; opercles lake-colour. Fins orange, dorsal with its upper half blackish.

Naini Tal specimens have the dorsal spine much less coarsely serrated than those from the plains, from whence they were introduced not many years since; they have also a darkish band along the side.

Hab. Assam, Lower Bengal, Orissa, Behar, N.W. Provinces, Punjab, and the Deccan; attaining at least 5 inches in length.

390. (52.) Barbus ticto.

Cyprinus ticto, *Ham. Buch. Fish. Ganges*, pp. 314, 389, pl. 8, fig. 87.
Barbus ticto, *Day, Fish. India*, p. 576, pl. cxliv, fig. 7 (see synon.).

Kaoli and *Kotree*, Hind.; *Kah-nee potiah*, Assam; *Wennatté*, Tamil; *Kudgi-kerundi*, Ooriah.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 23–26. L. tr. 5–6/6.

Length of head 5, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ of a diameter from end of snout, 1 diameter apart. *Teeth*—pharyngeal, crooked, pointed, 5, 3, 2/2, 3, 5. *Fins*—osseous dorsal ray strong and serrated, three quarters as long as the head, fin half as high as the body. Caudal forked. *Lateral line*—incomplete, ceasing after 6 or 8 scales; 4 or 5 rows of scales between it and base of the ventral fin, and 11 before the dorsal fin. *Colour*—silvery, sometimes stained with red, a black spot on the side of the tail before the base of the caudal fin and immediately behind the anal; a smaller one (frequently absent) at the commencement of the lateral line. Fins often black, sometimes orange.

Hab. Sind, throughout India and Ceylon. This fish rarely exceeds 4 inches in length.

391. (53.) Barbus stoliczkanus.

Barbus (Puntius) stoliczkanus, *Day, J. A. S. B.* xl, 1871, pt. 2, p. 328.
Barbus stoliczkanus, *Day, Fish. India,* p. 577, pl. cxliv, fig. 8 (see synon.).

B. iii. D. 10-11 (2-3/8). P. 14. V. 9. A. 7 (2/5). C. 19. L. l. 25. L. tr. 5/6.

Length of head one sixth, height of body one third of the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ of a diameter from end of snout, $1\frac{1}{2}$ apart. *Teeth*—pharyngeal, crooked, 5, 3, 2/2, 3, 5. *Fins*—osseous dorsal ray nearly as long as the head excluding the snout, serrated, but less strongly than in *B. ticto*, the serratures are likewise rather irregular; the fin commences midway between the snout and the base of the caudal, which latter is forked. *Lateral line*—complete, there are $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 9 rows before the dorsal fin. *Colour*—silvery, an oblong black mark on the lateral line about the third scale, and a deep black mark, yellow anteriorly, extending upwards almost to the back, above and a little behind the posterior extremity of the anal fin on the 18th and 19th scales. Fins orange.

Hab. Eastern Burma, where this species supersedes *B. ticto*. It attains 4 inches in length.

392. (54.) Barbus punctatus.

Puntius punctatus, *Day, P. Z. S.* 1865, p. 302.
Barbus punctatus, *Day, Fish. India,* p. 577, pl. cxliv, fig. 5 (see synon.).

Putter perlee, Mal.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 18. L. l. 23-24. L. tr. 5/5.

Length of head $5\frac{1}{4}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in the length of head, $\frac{1}{2}$ diameter from end of snout, and 1 diameter apart. *Fins*—dorsal fin commences over ventral and midway between end of snout and base of caudal, its upper border is slightly concave, its last undivided ray osseous, strong, serrated, and about as long as the head; the fin two thirds as high as the body. Caudal forked. *Lateral line*—complete, 3 rows of scales between it and the base of the ventral fin, 8 rows before the dorsal fin. *Colour*—olive-green superiorly, becoming white on the abdomen. A diffused black spot on the 20th and 21st scales of the lateral line. The anterior half of the third or fourth scale from the opercle, in the row next below the lateral line, black. Fins yellowish, dorsal and anal tipped with orange. Dorsal with two rows of black spots, and in Malabar examples a short intermediate one anteriorly. In some specimens there is a light edge round the caudal blotch, and a silvery band along the sides.

Hab. Malabar and Coromandel coast. This species does not appear to exceed 3 inches in length.

393. (55.) Barbus gelius.

Cyprinus gelius, *Ham. Buch. Fish. Gang.* pp. 320, 390.
Barbus gelius, *Günther, Catal.* vii, p. 154; *Day, Fish. India*, p. 577, pl. cxlv, fig. 3 (see synon.).

Cutturpoh, Ooriah; *Gili pungti*, Beng.

B. iii. D. 10–11 (2–3/8). P. 15. V. 9. A. 8 (3/5). C. 19. L. l. 23–24. L. tr. 4/5.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in the length of head, $\frac{1}{2}$ diameter from end of snout, 1 diameter apart. Third suborbital bone broad. *Fins*—dorsal arises slightly in advance of ventrals, its osseous ray is strong, rather coarsely serrated, and as long as the head excluding the snout, the fin two thirds as high as the body; caudal deeply forked. *Lateral line*—incomplete, ceasing after 5 or 6 scales; 3 rows of scales between lateral line and base of ventral fin, 8 rows before the dorsal fin. *Colour*—reddish brown, with a black band over the tail a little before the base of the caudal fin, and another less distinct close to the base of that fin. A silvery band along the side. The peritoneum being black appears like an irregular dark blotch. A black spot passes across the base of the anterior half of the dorsal, extending one third the distance up the rays. A black band over the base of the anal, highest in front. Occiput also black.

Hab. Ganjam, Orissa, Bengal, and Assam, attaining at least 2 inches in length.

394. (56.) Barbus phutunio.

Cyprinus phutunio, *Ham. Buch. Fish. Ganges*, pp. 319, 390.
Barbus phutunio, *Day, Fish. India*, p. 578, pl. cxlv, fig. 4 (see synon.).

Kudji-kerundi, Ooriah; *Phutuni pungti*, Beng.

B. iii. D. 10–11 (2–3/8). P. 15. V. 9. A. 8 (3/5) C. 19. L. l. 20–23. L. tr. 8–10.

Length of head 4 to $4\frac{2}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diameter from end of snout, 1 diameter apart. *Fins*—dorsal osseous ray serrated, the serratures often becoming indistinct in the adult; the fin commences opposite the ventrals. *Lateral line*—incomplete, only extending along three or four scales; from it to the base of the ventral are 3 rows; 9 rows before the dorsal fin. *Colour*—reddish brown, with a black band passing from the back to opposite the middle of the pectoral fin; a second from the back to the posterior end of the base of the anal; two other lighter bands pass downwards, one from the anterior, the other from the posterior extremity of the dorsal. A dark band down the centre of the dorsal, another at the base of the caudal. The adult in its colours

becomes very similar to *B. punctatus*, the pectoral band decreases in size, whilst that on the dorsal fin breaks up into spots.

Hab. Ganjam, Orissa and throughout Bengal and Burma; attaining 3 inches in length.

395. (57.) **Barbus cumingii.**

Barbus cumingii, *Günther, Catal.* vii, p. 155; *Day, Fish. India*, p. 578 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19. L. l. 21. L. tr. $3\frac{1}{2}/3\frac{1}{2}$.

Length of head 5, height of body 3 in the total length. *Eyes*—diameter $2\frac{3}{4}$ in the length of head, $\frac{2}{3}$ diameter from the end of snout, and 1 apart. Suborbital bones very deep. *Fins*—the dorsal commences opposite the insertion of the ventral, its last undivided ray is rather weak, osseous, and finely serrated. Pectoral reaches the ventral. Anal rather small. Caudal deeply forked. *Lateral line*—incomplete, ceasing after 4 scales; 3 rows of scales between the lateral line and base of the ventral fin, and 9 before the base of the dorsal. *Colour*—two dark vertical bands, one descending to the pectoral fin: the second across the free portion of the tail. Each scale with a silvery vertical streak (? a post-mortem appearance).

Hab. Ceylon; attaining to at least 2 inches in length.

396. (58.) **Barbus nigrofasciatus.**

Barbus nigrofasciatus, *Günther, Catal.* vii, p. 155; *Day, Fish. India*, p. 578, pl. cxliv, fig. 6.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 19. L. l. 20–21.

Length of head $4\frac{3}{4}$, height of body $2\frac{2}{3}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout and also apart. *Fins*—dorsal lower than the body; it commences opposite the ventrals, its osseous ray is strong and finely serrated. Caudal deeply forked. *Lateral line*—complete, 3 rows of scales beween it and the base of the ventrals. *Colour*—reddish, with a black band passing from eye to eye: body with three vertical black bands, the first from the back to the middle of the pectoral fin, the second from the base of the dorsal to behind the base of the ventral, and the third across the free portion of the tail. Dorsal, anterior portion of ventral and outer edge of anal black. The bands are not in exactly the same position in all specimens.

Hab. Southern Ceylon.

397. (59.) **Barbus guganio.**

Cyprinus guganio, *Ham. Buch. Fish. Ganges*, pp. 338, 392.
Barbus guganio, *Day, Fish. India*, p. 579.

Gugani, Beng.

B. iii. D. 10 (2/8). P. 12. V. 9. A. 7.

"Head oval, small, blunt and dotted. Mouth small. The jaws protrude in opening, the upper is the longest. . . . The eyes are far forwards on the sides of the head and large." *Fins*—the dorsal is near the middle, its osseous ray is strong and serrated. *Scales*—large and firmly adherent. *Lateral line*—incomplete. *Colour*—the back dotted.

Hab. Gangetic provinces and Assam, scarcely exceeding an inch and a half in length. This species is evidently allied to *Barbus ambassis*, p. 324.

398. (60.) Barbus stigma.

Leuciscus stigma, *Cuv. & Val. H. N. Poiss.* xvii, p. 93, pl. 489.
Barbus stigma, *Day, Fish. India*, p. 579, pl. cxli, fig. 5 (see synon.).

Chadu-perigi, Tel.; *Patia-kerundi*, Ooriah; *Katcha-karawa* and *Pottiah*, Hind.; *Katch-karawa*, Can.; *Kudale*, Maráthi; *Nga-khoon-ma*, Burm.

B. iii. D. 11–12 (3/8–9). P. 17. V. 9. A. 8 (3/5). C. 19. L. l. 23–26. L. tr. $4\frac{1}{2}$–5/5. Vert. 15/14.

Length of head 5, height of body $3\frac{1}{3}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{1}{2}$ to 1 diameter from end of snout, $1\frac{1}{2}$ to 2 diameters apart. *Teeth*—pharyngeal, crooked, 5, 3, 2/2, 3, 5. *Fins*—dorsal half to two thirds as high as the body; its last undivided ray osseous, rather weak or of moderate strength, entire, as long as the head without the snout, or even less; the fin commences rather in advance of the insertion of the ventral, and midway between the end of the snout and the base of the caudal. *Lateral line*—complete, 3 to $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin, 8 to 9 rows before the dorsal fin. Occasionally in the N.W. Provinces and Bengal specimens occur with l. l. 27. *Colour*—silvery, with a scarlet lateral band at some seasons, and a dark mark across the base of the middle dorsal rays, this last being occasionally absent. A round black blotch, more or less distinct, at the root of the caudal fin.

Hab. Sind, throughout India and Burma as high as Mandalay. As food this fish is bitter. In January 1868 I found 1850 developed ova in one female fish at Madras. It attains at least 5 inches in length.

399. (61.) Barbus chrysopterus.

Systomus chrysopterus, *McClell. As. Res.* xix, pt. 2; *Ind. Cyp.* p. 285.
Barbus chrysopterus, *Day, Fish. India*, p. 579, pl. cxliii, fig. 6 (see synon.).

Pottiah, Punj.; *Durru*, Sind.

B. iii. D. 11 (3/8). P. 17. V. 9. A. 7 (2/5). C. 19. L. l. 23–25. L. tr. 5/5.

Length of head 5, height of body 3 in the total length.

Eyes—diameter 3 to $3\frac{1}{2}$ in length of the head, $\frac{3}{4}$ to 1 diameter from end of snout. Body compressed. Third suborbital bone very narrow. *Fins*—dorsal arises over the ventral or slightly in advance of it, and midway between the end of the snout and the base of the caudal; its smooth osseous ray is not strong and is as long as the head without the snout; upper margin of the dorsal fin slightly concave; the height is only slightly above one half of that of the body. The pectoral extends to the ventral, and the latter to the anal. Lower caudal lobe slightly the longer. *Lateral line*—complete, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 9 rows before the dorsal fin. *Colour*—dull silvery, darkest along the back, each scale having a dark base formed by fine black dots. Dorsal, ventral, and anal fins generally stained with black spots at their extremities, but in some specimens only the anal. A dark mark at the base of third to seventh divided dorsal rays, sometimes a dark mark at base of the tail.

Hab. Assam, Bengal, N.W. Provinces, and Punjab and Sind.

400. (62.) Barbus thermalis.

Leuciscus thermalis, *Cuv. & Val. H. N. Poiss.* xvii, p. 94, pl. 490.
Barbus thermalis, *Day, Fish. India*, p. 580 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 9. A. 8 (3/5). C. 19. L. l. 24. L. tr. $5\frac{1}{2}/5\frac{1}{2}$.

Length of head $4\frac{1}{4}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diameter from end of snout. Dorsal profile more convex than the abdominal. Body very compressed. *Fins*—dorsal commences nearer to end of snout than to base of caudal fin; it is only two thirds as high as the body, its osseous ray moderately strong, rather longer than the head without the snout. *Lateral line*—incomplete, ceasing after eight scales. *Colour*—silvery, a round black finger-mark on either side of the free portion of the tail anterior to the base of the caudal fin, and a second at the base of the first few dorsal rays.

Hab. From a hot spring in Ceylon; attaining at least 3 inches in length.

401. (63.) Barbus terio.

Cyprinus terio, *Ham. Buch. Fish. Gang.* pp. 313, 389.
Barbus terio, *Day, Fish. India*, p. 580, pl. cxliv, fig. 3 (see synon.).

Kakachia-kerundi, Ooriah; *Teri-pungti*, Beng.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 19. L. l. 22–23. L. tr. 5/5.

Length of head 4 to $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter $2\frac{3}{4}$ to 3 in length of head, $\frac{3}{4}$ to 1 diameter from end of snout, $1\frac{1}{4}$ diameters apart. Body compressed. *Fins*—dorsal arises slightly in advance of the ventrals, its last undivided ray is osseous, entire, moderately or very strong, and nearly as long as the head; the fin is almost as high as the body

below it. *Lateral line*—incomplete, ceasing after 3 or 4 scales; 3 rows between the lateral line and base of the ventral fin, 9 rows in front of the dorsal fin. *Colour*—silvery, greenish along the back, each scale having a number of fine black spots, most numerous at the anterior margin. A large black blotch in the middle of the side over the posterior extremity of the anal, sometimes extended in the median line as far as the tail. A very indistinct black blotch (most apparent in the immature) exists under the posterior extremity of the dorsal, passing downwards to the middle of the fish. Fins yellowish, their margins stained with black, the dorsal having a median band. In some specimens there is a dark mark at the bases of the scales.

Hab. Orissa, Bengal to the Punjab; attaining 3 or 4 inches in length.

402. (64.) Barbus punjabensis.

Barbus (Puntius) punjaubensis, *Day, J. A. S. B.* xl, 1871, pt. 2, p. 334.
Barbus punjaubensis, *Day, Fish. India*, p. 580, pl. cxlv, fig. 2.

B. iii. D. 11 (3/8). V. 9. A. 7 (2/5). C. 19. L. l. 43. L. tr. 8/?.

Length of head $5\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—rather large, situated in the anterior half of the head, one third of a diameter from end of snout. *Fins*—dorsal two thirds as high as the body below it, arising midway between the snout and the base of the caudal fin; its last undivided ray weak and articulated. Caudal deeply forked, with pointed lobes. *Lateral line*—incomplete, 14 rows of scales before the base of the dorsal fin. *Colour*—silvery, with a burnished silvery stripe along the side, and a black spot at the base of the caudal fin. Two first dorsal rays and intermediate membrane deep black.

Hab. Sind, Ravi river at Lahore; also Jubbulpore. A small species, attaining about 2 inches in length.

403. (65.) Barbus unimaculatus.

Systomus (?) unimaculatus, *Blyth, J. A. S. B.* xxix, 1860, p. 159.
Barbus unimaculatus, *Day, Fish. India*, p. 581, pl. cxlv, fig. 5.

B. iii. D. 11 (3/8). P. 11. V. 8. A. 7 (2/5). C. 19.
L. l. 24–25. L. tr. $4\frac{1}{2}/4\frac{1}{2}$.

Length of head $3\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter 3 in the length of head, 1 diameter from the end of snout and also apart. *Fins*—dorsal with the last undivided ray osseous, entire, weak, and nearly as long as the head; the fin commences midway between the snout and the base of the caudal fin. *Lateral line*—incomplete, becoming lost opposite the posterior extremity of the dorsal fin, 3 rows of scales between it and the base of the ventral fin; 9 rows before the dorsal fin. *Colour*—silvery, a black mark at the base of each dorsal ray.

Hab. A number of fry up to $1\frac{8}{10}$ inches in length from the

Sitang river in Burma are in the Calcutta Museum; what they would be, when adults, it is difficult to determine, but as the lateral line is incomplete, they probably never would grow to large fish. The species is very similar to *Barbus thermalis*, C. V., but its head is a little longer, and the latter species is from Ceylon.

404. (66.) Barbus waageni.

Barbus (Puntius) waageni, *Day, J. A. S. B.* xli, 1872, pt. 2, p. 325.
Barbus waageni, *Day, Fish. India*, p. 581, pl. cxliv, fig. 4.

B. iii. D. 10–11 (2–3/8). P. 15. V. 9. A. 7 (2/5).
C. 20. L. l. 23. L. tr. 4/7.

Length of head 4, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ to 4 in the length of the head, $\frac{3}{4}$ to 1 diameter from end of snout, and $1\frac{1}{4}$ apart. *Fins*—dorsal one half as high as the body below it; it commences nearer to the base of the caudal fin than to the front end of the snout, its upper edge is straight; last undivided ray articulated. Pectoral as long as the head excluding the snout. Caudal forked. *Lateral line*—incomplete, ceasing about the seventh scale; $4\frac{1}{2}$ rows between it and the base of the ventral fin, 12 rows anterior to the dorsal fin. Caudal peduncle as high at its base as it is long. *Colour*—silvery, darkest superiorly; a dark blotch on the side of the tail on about the seventeenth and eighteenth rows of scales.

Hab. Choya Saidan Shah in the Punjab salt-range.

405. (67.) Barbus cosuatis.

Cyprinus cosuatis, *Ham. Buch. Fish. Gang.* pp. 338, 392.
Barbus cosuatus, *Day, Fish. India*, p. 581, pl. cxliv, fig. 1 (see synon.).

Koswati, Beng.

B. iii. D. 11 (3/8). P. 13. V. 9. A. 7 (2/5). C. 19.
L. l. 22. L. tr. 3/3.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head, $\frac{1}{2}$ diameter from end of snout, 1 diameter apart. *Fins*—dorsal without any osseous ray; it commences midway between the end of the snout and the base of the caudal fin, its upper edge is oblique and its height exceeds that of the body below it. *Lateral line*—incomplete, the row of scales on which it is situated is larger than the others, 2 rows between it and the base of the ventral fin; 8 or 9 rows before the base of the dorsal. *Colour*—silvery, the scales having dark bases; a black band along the top of the dorsal, another across its middle, another on the anterior anal rays.

Hab. Bengal, through the N.W. Provinces, the Deccan and Bombay, and down the Western coast as low as Kotayam in Travancore. This species attains 2 or 3 inches in length.

406. (68.) Barbus vittatus.

Puntius vittatus, *Day, P. Z. S.* 1865, p. 303.
Barbus vittatus, *Day, Fish. India*, p. 582, pl. cxliv, fig. 2 (see synon.).

Kooli, Hind.

B. iii. D. 10 (2/8). P. 12. V. 9. A. 7 (2/5). C. 20.
L. l. 20–22. L. tr. 3/4.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter from 2 to 3 in the adult in the length of the head, $\frac{2}{3}$ of a diameter from end of snout, $1\frac{1}{2}$ diameters apart. *Fins*—last undivided dorsal ray articulated, weak, and entire; the fin commences somewhat in advance of the ventrals. *Lateral line*—incomplete, ceasing after about 5 scales; 3 rows between it and the base of the ventral fin, 8 rows before the dorsal fin. *Colour*—silvery, generally with four black spots in the adult, one just before the dorsal, one below its posterior margin, another at the base of the caudal, and a fourth at the base of the anal. The dorsal has a vertical black streak, and a black tip with orange markings. In the immature the colours vary: when the fish is about eight tenths of an inch long, a vertical stripe begins to show itself in the posterior third of the dorsal fin, the summit of which also becomes edged with black, whilst there are some irregular orange markings; in very young specimens the line of demarcation between the green of the back and the silvery abdomen appears like a white band running from the eye to the middle of the tail. In some specimens one or more of the spots are absent.

Hab. Mysore, Madras, Wynaad, Malabar, Ceylon, and Cutch; attaining $1\frac{1}{2}$ inches in length.

407. (69.) Barbus filamentosus.

Leuciscus filamentosus, *Cuv. & Val. H. N. Poiss.* xvii, p. 96, pl. 492.
Barbus filamentosus, *Day, Fish. India*, p. 582 (see synon.).

Chevallé, Tamil.

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 21. L. tr. 4/4.

Length of head 5, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of the head, $\frac{2}{3}$ to 1 diameter from end of snout, $1\frac{3}{4}$ apart. Generally large pores over the snout. *Fins*—dorsal arises slightly nearer to snout than to base of caudal fin; its last undivided ray is osseous, smooth, and feeble, whilst the divided ones are all more or less elongate in the adult. *Lateral line*—complete, 2 rows of scales between it and the base of the ventral; 7 rows before the dorsal fin. *Colour*—silvery, each scale having a metallic green edging; a more or less distinct black blotch exists on the lateral line, on the fourteenth and fifteenth

scales, and before the base of the caudal fin. A very curious change occurs in this fish immediately after death, the whole of its body becoming scarlet. Caudal red, tipped with black and edged with white; dorsal and ventral nearly black.

Hab. Western coast and Southern India; attaining 6 inches in length. This form is similar to *B. mahecola* except in wanting barbels.

408. (70.) Barbus puntio.

Cyprinus puntio, *Ham. Buch. Fish. Ganges*, pp. 318, 389.
Barbus puntio, *Day, Fish. India*, p. 582, pl. cxlv, fig. 6 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 9. A. 7 (2/5). C. 21.
L. l. 23. L. tr. 5/4.

Length of head 4 to $4\frac{1}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter two fifths of length of head, $\frac{1}{2}$ to $\frac{3}{4}$ of a diameter from end of snout, 1 diameter apart. *Fins*—last undivided dorsal ray osseous and entire, the fin commences rather in advance of the ventrals. *Lateral line*—only extending distinctly for a few scales, but very indistinctly to the base of the caudal fin; $2\frac{1}{2}$ rows between it and the base of the ventral fin; 8 rows before the dorsal fin. *Colour*—silvery, a wide black band encircles the free portion of the tail, and includes the tip of the anal fin. Dorsal orange, tipped with black.

Hab. Bengal and Burma, attaining about 3 inches in length.

20. Genus NURIA, Cuv. & Val.

Syn. *Esomus*, Swainson.

Abdomen rounded. Pseudobranchiæ present. Mouth narrow, directed obliquely upwards; suborbitals broad. Barbels four, the rostral shorter than the maxillary pair; pharyngeal teeth crooked, pointed, 5/5. Dorsal fin without osseous ray, and with but few branched ones; it is inserted behind the ventral, but does not extend to over the anal; the latter has but few branched rays or a moderate number. Scales of moderate size. Lateral line, when present, passing to the lower half of the base of the caudal fin. Gill-rakers short.

409. (1.) Nuria danrica. (Fig. 106.)

Cyprinus danrica, *Ham. Buch. Fish. Ganges*, pp. 325, 390, pl. xvi, fig. 88.
Nuria danrica, *Day, Fish. India*, p. 583, pl. cxlv, fig. 7 (var. *malabarica*) and fig. 8 (var. *alta*) (see synon.).

Danrica and *Jongja*, Beng.; *Kurriah dahwiee*, Hind.; *Purroovoo*, Tamil; *Soomarah*, Hind. (N.W. Prov.); *Chid-dül-lu*, Punjabi; *Káti*, Mahr.; *Mola* and *Mah-wa*, N.W. Prov.; *Nga-zin-byoon*, Burmese.

B. iii. D. 8 (2/6). P. 15. V. 9. A. 8 (3/5).
L. l. 30–34. L. tr. 5–6/3.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout and apart. *Barbels*—the rostral not so long as the head, the maxillary extend to the base of the ventral or even to that of the caudal fin. *Fins*—dorsal commences nearer to the base of the caudal than

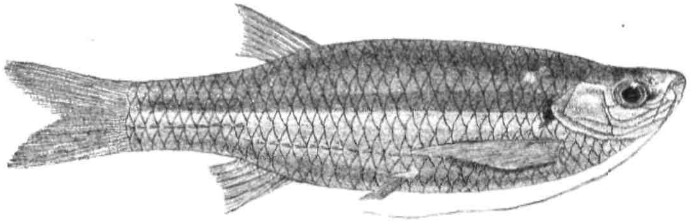

Fig. 106.—*Nuria danrica*, var. *alta*.

to the head; pectoral varies with age, being generally proportionately longer in the immature; sometimes the anal fin is higher than the dorsal, especially in the immature. *Lateral line*—usually present, entire; 2 rows of scales between it and the base of the ventral, 18 before the dorsal fin. *Colour*—a broad black lateral band, sometimes absent.

The variety *Nuria alta*, Blyth, is a Burmese form, which differs in the height of its body, being $4\frac{1}{2}$ (instead of $5\frac{1}{2}$) in the total length, and its anal fin is a little lower.

Hab. India, Ceylon, Burma, and the Nicobars. Dr. Cumberland found this fish in a hot stream of 112° Fahr. at Pooree, M. Regnaud in a hot stream at Cannia in Ceylon; it attains 5 inches in length.

21. Genus **RASBORA**, Bleeker.

Syn. *Leuciscus*, sp., Cuv. & Val.; *Megarasbora*, Günther.

Abdomen rounded. Pseudobranchiæ present. Cleft of mouth oblique, lower jaw slightly prominent, having one central and two lateral prominences, one on each side, fitting into corresponding emarginations in the upper jaw. Barbels two (rostral), or none. Eyes with free lids. Pharyngeal teeth 5, 3 or 4, 2/2, 3 or 4, 5. Dorsal fin without any osseous ray and few branched ones, inserted behind the origin of the ventral but not extending to above the anal, which is short. Scales large or of moderate size. Lateral line concave, continued to the middle or lower half of the caudal fin. Gill-rakers short and lanceolate.

Geographical Distribution. Africa, India, Ceylon, Burma, to the Malay Archipelago.

Synopsis of Indian Species.

a. Barbels present (*Megarasbora*).
  D. 2/7, A. 2/5, L. l. 40–44 .... 1. *R. elanga*, p. 336.
b. Barbels absent (*Rasbora*).
  D. 2/7, A. 2–3/5, L. l. 31–34. Generally a black lateral stripe .... 2. *R. daniconius*, p. 336.
  D. 2/7, A. 2/5–6, L. l. 26–29. Caudal black-edged............................ 3. *R. buchanani*, p. 337.

410. (1.) **Rasbora elanga.**

Cyprinus elanga, *Ham. Buch. Fish. Gang.* pp. 281, 386.
Rasbora elanga, *Day, Fish. India*, p. 584, pl. cxlvi, fig. 1 (see synon.).

Dahwiee, Hind.; *Elang*, Assam.

B. iii. D. 9 (2/7). P. 15. V. 8-9. A. 7 (2/5). C. 19.
L. l. 40–44. L. tr. 7–8/6.

Length of head 5 to $5\frac{1}{2}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter from 3 to 4 in the length of head, 1 diameter from end of snout, $1\frac{1}{2}$ diameters apart. Jaws of equal length, prominences and emarginations well-defined. *Barbels*—one short rostral pair. *Teeth*—pharyngeal, 5, 4, 2/2, 4, 5. *Fins*—dorsal commences midway between the posterior margin of the orbit and the base of the caudal fin. The pectoral, which is nearly as long as the head, does not reach the ventral. Caudal forked. *Scales*—$1\frac{1}{2}$ to 2 rows between lateral line and base of ventral fin; 14 rows before base of dorsal fin. *Colour*—silvery, with sometimes a leaden-coloured band along the upper portion of the side.

Hab. Bengal, Assam, and Burma; attaining at least 8 inches in length.

411. (2.) **Rasbora daniconius.**

Cyprinus daniconius, *Ham. Buch. Fish. Gang.* pp. 327, 391, pl. xv, fig. 89.
Rasbora daniconius, *Day, Fish. India*, p. 584, pl. cxlvi, fig. 2, and fig. 3 (var. *R. nilgherriensis*) (see synon.).

Mile-lo-ah, N.W. Prov.; *Chin-do-lah*, *Raan-kaal-le* and *Charl*, Punj.; *Neddean jubbu*, Canarese; *Ovaree candee* and *Purroovoo candee*, Tamil; *Kokanutchee*, Mal.; *Jilo*, Ooriah; *Danikoni* and *Angjani*, Beng.; *Doh-ni-ko-nah*, Assam; *Nga-doung-zee* and *Nga-nauch-youn*, Burm.; *Jonir*, Cutch; *Dándvan*, Maráthi.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 7 (2/5). C. 19.
L. l. 31–34. L. tr. $4\frac{1}{2}$/5. Vert. 18/14.

Length of head $4\frac{1}{2}$ to 5, height of body $4\frac{1}{2}$ to $5\frac{1}{4}$ or even 6 in the total length. *Eyes*—diameter $3\frac{2}{3}$ to 4 in the length of head, 1 diameter from end of snout and also apart. Prominences and emarginations on jaws well-defined. Cleft of mouth extends to beneath

anterior margin of orbit. *Teeth*—pharyngeal, curved, sharp, 5, 3, 2/2, 3, 5. *Fins*—dorsal commences rather nearer to origin of the ventral than to that of anal in some examples, at an equal distance from both in others. *Lateral line*—descends very gradually for the depth of 2 rows of scales; 2 rows between it and ventral fin, 14 rows in front of dorsal fin. *Colour*—a black band, more or less distinct, passes from the eye to the base of the caudal. Sometimes this band only exists just at its termination and thus forms a spot at the side of the base of the tail; or in some young specimens a bright silvery band edged above with yellow is seen along the sides. Caudal occasionally with its lobes tipped with grey.

Hab. Continent of India, Ceylon, Burma, Malay Archipelago, and Zanzibar; attaining 8 inches in length. Much more common than *R. buchanani*.

412. (3.) **Rasbora buchanani.** (Fig. 107.)

Cyprinus rasbora, *Ham. Buch. Fish. Ganges*, pp. 329, 391, pl. 2, fig. 90.
Rasbora buchanani, *Bleeker, Prod. Cyp.* p. 451; *Day, Fish. India*, p. 584, pl. cxlv, fig. 10 (see synon.).

B. iii. D. 9 (2/7). P. 15. V. 9. A. 7–8 (2/5–6). C. 19. L. l. 26–29. L. tr. $4\frac{1}{2}$/3.

Length of head 5, height of body 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, about 1 diameter from end of snout, and rather more apart. Prominences on jaws well-developed. *Fins*—dorsal commences nearer to the base of the caudal than to the snout. *Lateral line*—concave, 2 rows of scales between

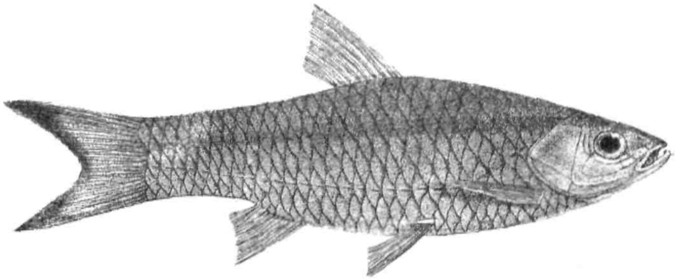

Fig. 107.—*Rasbora buchanani.*

it and the base of the ventral fin; 12 rows anterior to the base of the dorsal fin. *Colour*—silvery, a faint streak along the sides; caudal usually tipped with black, especially in Burmese examples.

Hab. Continent of India, Assam, Burma, and Pinang; in Inbia most common in the valley of the Ganges and along the Coromandel coast. This species attains 4 or 5 inches in length.

22. Genus ASPIDOPARIA (Heckel), Bleeker.

Syn. *Morara*, Bleeker.

Abdomen rounded. Mouth small, inferior, the lower jaw havi a sharp crescentic edge destitute of lip. Barbels absent. Si orbital ring of bones of moderate width or broad. Dorsal without osseous and with rather few branched rays, commenci opposite to or behind the origin of the ventrals, but not extendi to above the anal, which latter has a moderate number of ra (10 to 12). Scales of moderate size. Lateral line concave, a passing along the lower half of the base of the caudal fin.

Geographical Distribution. Throughout Bengal, Assam, Bomb and Orissa as far as the Kistna river, also Burma.

Synopsis of Indian Species.

D. 9–10, A. 10–12, L. l. 38–42 .... 1. *A. morar*, p. 3
D. 9, A. 9, L. l. 52–60 .... 2. *A. jaya*, p. 33

413. (1.) Aspidoparia morar. (Fig. 108.)

Cyprinus morar, *Ham. Buch. Fish. Ganges*, pp. 264, 384, pl. 31, fig.
Aspidoparia morar, *Day, Fish. India*, p. 585, pl. cxlvi, fig. 4 (
synon.).

Bayi, Ooriah; *Morari* and *Morar*, Beng.; *Pa-o-char* and *Chih* Punj.; *Ka-reer-re*, Sind.; *Amlee*, Deccan; *Chippuah*, *Chelluah*, Hi (N.W. Prov.); *Mou-ah* and *Boreala*, Assam; *Nga-hpyen-boo* and *Y boung-za*, Burmese.

B. iii. D. 9–10 (2–3/7–8). P. 15. V. 8. A. 10–12 (2/8–1
C. 19. L. l. 38–42. L. tr. $5\frac{1}{2}$/5. Vert. 14/21.

Length of head 5 to $5\frac{3}{4}$, height of body 4 to $5\frac{1}{2}$ in the to length. *Eyes*—diameter 3 to $3\frac{2}{3}$ in length of head, $\frac{3}{4}$ to 1 diamet from end of snout, and 1 apart. Snout very obtuse. Upper j

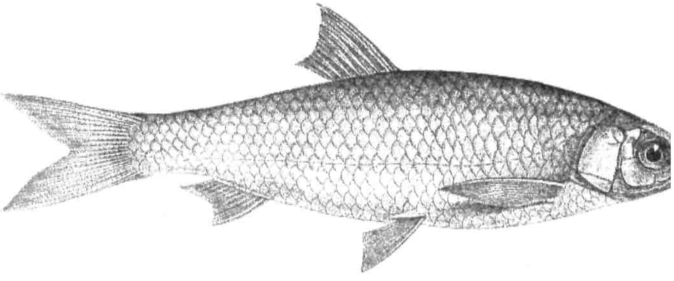

Fig. 108.—*Aspidoparia morar.*

overlapping the lower. A broad suborbital ring of bones. *Tee* —pharyngeal, 5, 4, 2/2, 4, 5, plough-shaped, the outer row mu

larger than the inner ones. *Fins*—dorsal higher than long, with a concave superior margin; it arises midway between the posterior margin of the orbit and the base of the caudal; pectoral as long as the head. *Scales*—$2\frac{1}{2}$ to 3 rows between lateral line and base of ventral fin; 20 rows before base of dorsal fin. *Colour*—back light brown, divided from the silvery side by a burnished streak.

Hab. Sind, Punjab, Continent of India (except the Western coast, and localities south of the Kistna river), also Assam and Burma: attaining at least 7 inches in length.

414. (2.) **Aspidoparia jaya.**

Cyprinus jaya, *Ham. Buch. Fish. Ganges*, pp. 333, 392.
Aspidoparia jaya, *Day, Fish. India*, p. 585, pl. cxlv. fig. 9 (see synon.).

Chola, Assam; *Pahruah*, Hind. (N.W. Prov.).

B. iii. D. 9 (2/7). P. 15. V. 8. A. 9 (2/7). C. 21. L. l. 52–60. L. tr. 7/10.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ to 1 diameter from end of snout, $1\frac{1}{2}$ diameters apart. Mouth considerably overhung by the snout. Both the preorbital and first suborbital bones touch the upper lip; only about half the cheek is covered by the suborbital ring of bones. *Teeth*—pharyngeal, 4, 3/3, 4, the outer row plough-shaped and compressed, the inner consisting of very minute teeth. *Fins*—dorsal commences midway between the snout and the base of the caudal, and opposite the insertion of the ventral. *Scales*—deciduous. *Lateral line*—curving at its termination on to the lower half of the caudal fin; $4\frac{1}{2}$ rows of scales between it and the base of the ventral fin. *Colour*—silvery, back darkest.

Hab. Hardwar on the Ganges and Assam.

23. Genus **ROHTEE**, Sykes.

Syn. ***Osteobrama***, Heckel; ***Smiliogaster***, Bleeker.

Abdomen rounded. Pseudobranchiæ present. Mouth anterior, lips thin. Barbels present or absent, sometimes quite rudimentary. Pharyngeal teeth, 6 or 5 or 4, 4 or 3, 2 or 3/3 or 2, 3 or 4, 4 or 5 or 6. Dorsal fin short, having an osseous serrated spine, and commencing opposite the interspace between the bases of the ventral and anal fins, the latter of which has many rays. Scales small. Lateral line passing nearly to the centre of the base of the caudal fin. Gill-rakers short.

Geographical Distribution. India generally and Burma.

Synopsis of Indian Species.

A. With four barbels.
D. 11, A. 14, L. l. 44 .... 1. *R. bakeri*, p. 340.
D. 12, A. 20, L. l. 59 .... 2. *R. neilli*, p. 340.

B. Without any, or with only rudimentary barbels.

D. 11–12, A. 29–36, L. l. 55–70	3. *R. cotio*, p. 340.
D. 11, A. 25–28, L. l. 75–80	4. *R. vigorsii*, p. 341.
D. 11–12, A. 20–21, L. l. 68–73	5. *R. belangeri*, p. 342.
D. 11, A. 16, L. l. 55	6. *R. ogilbii*, p. 342.
D. 12, A. 30, L. l. 44	7. *R. cunma*, p. 343.

415. (1.) Rohtee bakeri.

Rohtee bakeri, *Day, P. Z. S.* 1873, p. 240; *Fish. India*, p. 586, pl. cxlvii, fig. 1.

B. iii. D. 11 (3/8). P. 13. V. 10. A. 14 (3/11). L. l. 44. L. tr. 8/7.

Length of head from 5 to 6, height of body from 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter two fifths of length of head, two thirds of a diameter from end of snout, and 1 apart. Profile over nape rather concave, a considerable rise to the base of the dorsal fin. Upper jaw the longer. *Barbels*—four, all very short. *Fins*—dorsal rather higher than the body, its spine weak, as long as the head or rather longer, and serrated posteriorly in almost its whole extent. Caudal deeply forked. *Scales*—$5\frac{1}{2}$ rows between the lateral line and the base of the ventral fin; 15 rows before the base of the dorsal fin. *Colour*—silvery, caudal and dorsal edged with black.

Hab. Kotayam in Travancore, whence I received specimens up to $4\frac{1}{2}$ inches in length.

416. (2.) Rohtee neilli.

Rohtee neilli, *Day, P. Z. S.* 1873, p. 239; *Fish. India*, p. 586, pl. cxlvi, fig. 5.

B. iii. D. 12 (4/8). P. 13. V. 10. A. 20 (3/17). C. 19. L. l. 59. L. tr. 12/18.

Length of head $4\frac{3}{4}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ in the length of the head, $\frac{2}{3}$ of a diameter from end of snout and also apart. Profile over nape concave, from thence a considerable rise to the base of the dorsal fin. Upper jaw somewhat the longer. *Barbels*—two pairs, all about as long as the eye. *Fins*—dorsal three fourths as high as the body, its last undivided ray osseous, very strong, serrated, and as long as the head excluding the snout. Pectoral nearly as long as the head. Caudal deeply forked. *Lateral line*—strongly marked in its first few scales, the rows of scales nearly regular; 8 rows between the lateral line and base of ventral fin. Free portion of the tail as long as high. *Colour*—silvery, opercles golden.

Hab. Bhaváni river at base of the Nilgiri hills.

417. (3.) Rohtee cotio. (Fig. 109.)

Cyprinus cotio, *Ham. Buch. Fish. Ganges*, pp. 339, 393, pl. 39, fig. 93.
Rohtee cotio, *Day, Fish. India*, p. 587, pl. cli, fig. 1, pl. cxlvii, fig. 2 (var. *R. alfrediana*) (see synon.).

Koti and *Goonta*, Beng.; *Goordah*, *Chen-da-lah* and *Muck-nee*, Hind. (N.W. Prov.); *Puttoo* and *Duh-riee*, Sind; *Nya-hpan-ma*, Burm.; *Gud-dáni*, Maráthi; *Gunda*, Ooriah.

B. iii. D. 11–12 (3–4/8). P. 13. V. 10. A. 29–36 (2–3/27–33). C. 19. L. l. 55–70. L. tr. 9–15/14–21.

Length of head $5\frac{1}{2}$ to 6, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in the length of head, one half a diameter from the end of the snout, and 1 to $1\frac{1}{4}$ apart. Profile over nape concave, from thence a great rise to the base of the dorsal fin. Upper jaw slightly the longer. *Barbels*—absent or very

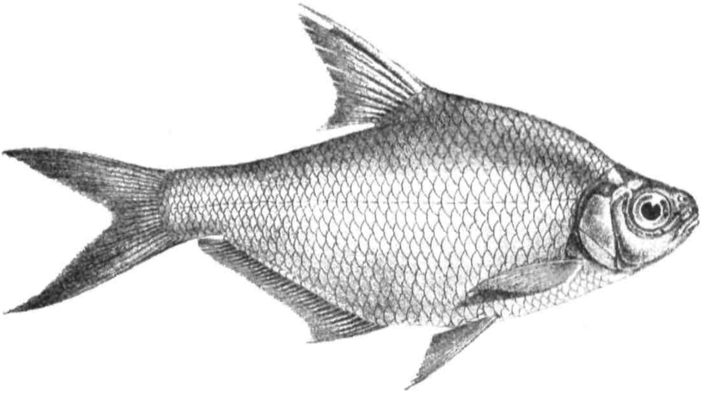

Fig. 109.—*Rohtee cotio*, var. *alfrediana*.

rudimentary. *Fins*—dorsal with its osseous ray weak and serrated. Pectoral reaches to over ventral and the latter to the anal. Caudal lobed. *Scales*—vary in number along the lateral line, whilst in some specimens (var. *cotio*) the rows are very irregular in the last three fourths of the body below the lateral line. The number of rows between the lateral line and base of the ventral fin also varies, being most in the variety *R. cotio* (12–13), whereas in the variety *R. alfrediana* there are rarely more than 7 or 8; 24 rows of scales before the base of the dorsal fin. *Colour*—silvery, darkest along the back and sometimes with a silvery lateral band. Some have a black blotch before the base of the dorsal fin, and another on the nape.

Hab. From Sind throughout India (except the Malabar coast and south of the Kistna) and Burma; attaining at least 6 inches in length.

418. (4.) Rohtee vigorsii.

Rohtee vigorsii, *Sykes*, *Tr. Z. S.* ii, 1841, p. 364, pl. 63, fig. 3; *Day*, *Fish. India*, p. 587, pl. cxlvii, fig. 3 (see synon.).

Gollund, Ooriah; *Khira*, Tel.; *Phek*, Maráthi.

B. iii. D. 11 (3/8). P. 19. V. 10. A. 25–28 (2–3/23–26). C. 19. L. l. 75–80. L. tr. 16–18/21.

Length of head 5, height of body 3 to 4 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, 1 diameter from end of snout and also apart. Dorsal profile elevated, a concavity from the snout to over the nape. The lower jaw somewhat longer than the upper, whilst posteriorly the cleft of the mouth extends to below the anterior margin of the orbit. Preorbital nearly as high as broad, suborbitals very narrow. *Barbels*—absent; or a very rudimentary maxillary pair. *Teeth*—pharyngeal, crooked, 5, 4, 2/2, 4, 5. *Fins*—dorsal spine strong and deeply denticulated, its osseous portion not so long as the head. Pectoral as long as the head excluding the snout. Caudal deeply forked. *Lateral line*—most strongly developed in the first few scales; 11 rows between it and base of ventral fin; 34 rows before base of dorsal fin. *Colour*—greenish superiorly, silvery beneath; snout black; the caudal fin slightly stained with grey. The young have a silvery band along the side.

Hab. Deccan, Kistna and Godávari rivers to their terminations. It attains at least 9 inches in length.

419. (5.) Rohtee belangeri.

Leuciscus belangeri, *Cuv. & Val. H. N. Poiss.* xvii, p. 99.
Rohtee belangeri, *Day, Fish. India*, p. 587, pl. cxlvii, fig. 4 (see synon.)

Nga-hpeh-oung, *Nga-net-hya*, and *Nga-p'hama*, Burm.

B. iii. D. 11–12 (3–4/8). P. 17. V. 9. A. 20–21 (3/17–18). C. 17. L. l. 68–73. L. tr. 18/22.

Length of head $5\frac{1}{2}$ to 6, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of head, $\frac{3}{4}$ of a diameter from end of snout, $1\frac{1}{2}$ diameters apart. Lower jaw slightly the shorter. *Teeth*—pharyngeal, 4, 3, 2/2, 3, 4, with the outer one in each row serrated on its edges. *Fins*—dorsal osseous ray strong and serrated posteriorly, the bony portion being as long as the head. Caudal deeply lobed. *Scales*—14 rows between lateral line and base of ventral fin; 25 rows before base of dorsal fin. *Colour*—silvery, back greyish, and the Indian variety is partially banded in the young. Sometimes a dark streak from the shoulder to the base of the pectoral fin. The very young have a black band over the free portion of the tail.

Hab. The Godávari river, and throughout Burma, but the specimens from the latter locality are darker in colour and want the vertical bands. This species attains 15 inches and more in length.

420. (6.) Rohtee ogilbii.

Rohtee ogilbii, *Sykes, Tr. Z. S.* ii, 1841, p. 364, pl. lxiii, fig. 2; *Day, Fish. India*, p. 588, pl. cxlvii, fig. 5 (see synon.).

B. iii. D. 11 (3/8). P. 15. V. 10. A. 16 (3/13). C. 20. L. l. 55. L. tr. 13/11.

Length of head 5 to 6, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ to $3\frac{1}{2}$ in length of head, $\frac{2}{3}$ to 1 diameter from end of snout, $1\frac{1}{4}$ diameters apart. Dorsal profile rather more convex than that of the abdomen. Lower jaw the shorter. *Barbels*—absent. *Teeth*—pharyngeal, curved, pointed, 5, 4, 2/2, 4, 5. *Fins*—dorsal osseous ray strong and coarsely serrated. Caudal lobed in its last two thirds. *Scales*—nine or ten rows between lateral line and base of ventral fin. *Colour*—purplish silvery along the back, becoming silvery white from about four rows of scales above the lateral line. The young sometimes have a dark spot at the base of the caudal fin, and four or five narrow black bands descending from the back to the middle of the side.

Hab. Deccan, the Kistna and Godávari rivers; attaining 6 inches or more in length.

421. (7.) Rohtee cunma.

Abramis cunma, *Tickell, MSS.*
Rohtee cunma, *Day, Fish. India, Suppl.* p. 807.

Nga-koon-ma, Burmese.

B. iii. D. 12 (3/9). P. 13. V. 10. A. 30. C. 18. L. l. 44.

Length of head $5\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter 3 in the length of the head, 1 diameter from the end of the snout and also apart. Profile over nape slightly concave, a considerable rise from snout to base of dorsal fin; snout somewhat obtuse, upper jaw the longer. *Fins*—dorsal anteriorly two thirds as high as the body below it, commencing somewhat nearer to the snout than to the base of the caudal fin, its spine weak and longer than the head, not serrated. Caudal deeply forked, lower lobe somewhat the longer. *Lateral line*—strongly marked in its first four scales. *Colour*—olive above, becoming silvery on the sides and below; a brassy tinge along the lateral line and over the cheeks and gill-covers. Fins amber; dorsal and caudal with a narrow black edge.

Hab. Colonel Tickell procured this species at Moulmein, where he found it to be common. His figure is $5\frac{1}{2}$ inches long.

24. Genus BARILIUS, Hamilton Buchanan.

Syn. *Opsarius*, sp., McClelland; *Pachystomus*, Heckel; *Chedrus*, Swains.; *Shacra*, Bleeker; *Opsaridium*, Peters; *Pteropsarion* and *Bola* (not H. B.), Günther.

Abdomen rounded. Pseudobranchiæ present. Mouth anterior, sometimes oblique, having a moderate or deep cleft. Jaws compressed, the lower usually with a knob above the symphysis, and an emargination to receive it in the upper jaw. Suborbital ring of

be entirely behind the vertical from the posterior margin of the orbit. Barbels four (*Pachystomus*, "Heckel," Bleeker), or two (*Bendilisis*, Bleeker), or none (*Barilius*, Ham. Buch.); occasionally very rudimentary ones are present. Pharyngeal teeth in two or three rows, hooked, 5, 3 or 4, 2 or 1/1 or 2, 4 or 3, 5; or else 5, 2 or 3, 4/4, 3 or 2, 5. Dorsal fin without osseous ray, of moderate length, inserted posteriorly to the ventrals, sometimes extending to above the anal, which latter is somewhat elongated. Scales of moderate or small size. Lateral line concave, continued on to the middle or lower half of the caudal, or incomplete, or absent. Gill-rakers very short or absent.

The genera *Barilius* and *Danio* are somewhat difficult to diagnose apart; the former, however, has the snout compressed, the mouth anterior, and usually spots or vertical bars on the body. In *Danio* the upper jaw is rather broad, the mouth directed obliquely upwards, the apex of the lower jaw being nearly or quite on a level with the dorsal profile; the body with longitudinal bands. Adult specimens of *Barilius* have usually open pores or glands on the snout and jaws.

Geographical Distribution. Fresh waters of India, Ceylon, and Burma, extending to the Malay Archipelago; also found in the Nile and East Africa.

Synopsis of Indian Species.

A. With four barbels. (*Pachystomus.*)

D. 9, A. 13–15, L. l. 42–44, 10 vertical bars	1. *B. vagra*, p. 345.
D. 9, A. 12–13, L. l. 43. Back dark, sides silvery	2. *B. modestus*, p. 345.
D. 9, A. 12, L. l. 56–62. Silvery	3. *B. radiolatus*, p. 346.
D. 9, A. 10, L. l. 60–70. Twelve vertical bars	4. *B. shacra*, p. 346.
D. 9, A. 9–10, L. l. 40–43. Short vertical bars; each scale with a black spot in adults	5. *B. bendelisis*, p. 347.

B With two barbels. (*Bendilisis.*)

D. 9, A. 13–14, L. l. 43–46. With 14 or 15 vertical bars	6. *B. barila*, p. 348.

C. Without or with only rudimentary barbels. (*Barilius.*)

D. 13, A. 16–17, L. l. 38. A row of large spots	7. *B. bakeri*, p. 348.
D. 10–12, A. 15–17, L. l. 40. 15 vertical bars	8. *B. gatensis*, p. 349.
D. 2–13, A. 14–16, L. l. 38. Two rows of spots	9. *B. canarensis*, p. 350.
D. 9, A. 13–14, L. l. 39–42. Nine vertical bands	10. *B. barna*, p. 350.
D. 9, A. 14, L. l. 44–48. Two rows of spots	11. *B. guttatus*, p. 351.

D. 9, A. 13, L. l. 70–75. Two rows of spots .... 12. *B. tileo*, p. 351.
D. 9, A. 14–15, L. l. 40. Silvery........ 13. *B. evezardi*, p. 352.
D. 10–11, A. 13, L. l. 88–94. Two rows of blotches .... 14. *B. bola*, p. 352.

422. (1.) Barilius vagra.

Cyprinus vagra, *Ham. Buch. Fish. Ganges*, pp. 269, 385.
Barilius vagra, *Day, Fish. India*, p. 589, pl. cxlviii, fig. 3 (see synon.).

Lo-har-ree and *Charl*, Punj.; *Mon-e-o-ree*, Assam.

B. iii. D. 9 (2/7). P. 16. V. 9. A. 13–15 (2–3/11–12). C. 19. L. l. 42–44. L. tr. 7–8/4. Vert. 16–23.

Length of head 5 to 5½, height of body 5 to 6 in the total length. *Eyes*—diameter 3½ to 4 in length of head, 1 diameter from end of snout and 1¼ apart. The posterior extremity of the maxilla extends to beneath the middle of the orbit; lower jaw slightly the longer. Third suborbital bone twice as deep as the uncovered portion of the cheek below it. Jaws of equal length anteriorly, the upper sometimes a little notched, the lower covered with large pores in the adult. Axillary process very short. *Barbels*—rostral nearly half as long as the head, maxillary pair very short. *Teeth*—pharyngeal, crooked, 5, 3, 2/2, 3, 5. *Fins*—dorsal commencing midway between the posterior edge of the orbit and the root of the caudal, its last two rays being over the anal; pectoral not quite so long as the head; caudal deeply forked. *Scales*—2 to 2½ rows between lateral line and base of ventral fin; 20 rows before base of dorsal. *Colour*—silvery, 10 to 14 dark bands (sometimes indistinct) descend from the back to the lateral line; fins yellowish, the edge of the caudal stained greyish.

Hab. Sind hills, rivers in the Himalayas and Sub-Himalayan range, Jumna and Ganges, also the Punjab, Assam, and Ceylon. This species attains above 5 inches in length.

423. (2.) Barilius modestus.

Barilius (Pachystomus) modestus, *Day, J. A. S. B.* xli, 1872, p. 4.
Barilius modestus, *Day, Fish. India*, p. 589, pl. cli, fig. 3 (see synon.).

Laccya, Arabi.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 12–13 (2/10–11). C. 19. L. l. 43. L. tr. 6/4½.

Length of head 5½, height of body 5¾ in the total length. *Eyes*—diameter 4 in the length of head and situated in its anterior half, 1 diameter from end of snout and also apart. Suborbital ring of bones wide, the third nearly touching the preopercular ridge. Upper jaw slightly the longer, and notched at its end in large examples. The posterior extremity of the maxilla reaches to below the middle of the orbit. *Barbels*—rostral extend to beneath

the front margin of the eyes, maxillary pair minute. Axillary process short. *Fins*—dorsal commencing midway between the middle of the caudal lobes and the snout; it is entirely, or all but the last ray, in advance of the anal. Pectoral nearly as long as the head, but not reaching the ventrals, which last extend halfway to the base of the anal. *Lateral line*—very slightly concave, two and a half rows of scales between it and the base of the ventral fin; 19 rows before the base of the dorsal fin. *Colour*—back brownish, strongly defined from the silvery sides; caudal edged with dark; the other fins yellow; a dark band along the dorsal.

Hab. The Indus in Sind, and the Ravi river at Lahore; attaining 4 or 5 inches in length.

424. (3.) Barilius radiolatus.

Barilius radiolatus, *Günther, Cat.* vii, p. 287; *Day, Fish. India*, p. 590.

B. iii. D. 10 (2/8). P. 17. V. 9. A. 12 (2/10). C. 19.
L. l. 56–62. L. tr. 9–10/6.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length, excluding the caudal fin. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ to 1 diameter from end of snout, and rather more apart. The posterior extremity of the maxilla extends to a little behind the front edge of the orbit; the lower jaw projects slightly when the mouth is closed. The third suborbital bone nearly reaches the preopercular ridge. Axillary process short. *Barbels*—two short pairs. *Fins*—the dorsal higher than long, commencing midway between the eye and the root of the caudal fin, its last ray not extending so far as to above the anal. The pectoral does not reach the ventral nor the latter the anal. Caudal apparently deeply forked. *Scales*—two rows between lateral line and base of ventral fin; 24 rows before base of dorsal. The specimens in the British Museum are in a very bad state.

Hab. Central India.

425. (4.) Barilius shacra.

Cyprinus shacra, *Ham. Buch. Fish. Gang.* pp. 271, 385.
Barilius shacra, *Day, Fish. India*, p. 590, pl. cxlviii, fig. 5 (see synon.).

Gurha, Punj.

B. iii. D. 9 (2/7). P. 15. V. 8. A. 10 (2/8). C. 19.
L. l. 60–70. L. tr. 10–11/9.

Length of head 5 to $5\frac{1}{4}$, height of body 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 diameter from end of snout and also apart. Jaws of about equal length in front. Third suborbital bone two thirds as wide as the uncovered portion of the cheek below it. *Barbels*—the maxillary pair as long as the eye, the rostral slightly longer. Axillary process extends to rather behind origin of pectoral fin. *Teeth*—pharyngeal, 5, 3/3, 5, crooked.

Fins—last dorsal ray over the first anal. The six outer pectoral rays strong, more especially in the adult. Caudal deeply forked. *Lateral line*—goes to the centre of the base of the caudal fin, about 7 rows of scales between it and the base of the ventral fin; 25 before the dorsal fin. *Colour*—back olive, rest of the body pinkish silvery; about twelve incomplete bars from the back downwards towards the lateral line, a dark bar along the upper third of the dorsal fin. The lower two thirds of the vertical fins stained in some examples.

Hab. From Hurdwar down the valley of the Ganges, the N.W. Provinces, and Assam. The species is said to attain 5 inches in length.

426. (5.) Barilius bendelisis.

Cyprinus bendelisis, *Ham. Buch. Journ. Mysore*, iii, p. 345, pl. 32.
Barilius bendelisis, *Day, Fish. India*, p. 590, pl. cxlviii, figs. 7, 8, and 9 (see synon.).

Khoksa, Beng.; *Pak-tah, Kun-nul, Dah-rah, Burreah*, and *Puck-wah-ree*, Punj.; *Johra*, Mahr.; *Aguskitti* and *Marritan candee*, Tam.; *Bahgra bahri*, Ooriah; *Nga gyá*, Burm.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 9–10 (2–3/7–8). C. 18. L. l. 40–43. L. tr. 7–8/5.

Length of head $4\frac{2}{3}$ to $5\frac{1}{4}$, of caudal 5 to $5\frac{1}{2}$, height of body $4\frac{1}{4}$ (to $5\frac{1}{4}$ in the young) in the total length. *Eyes*—diameter $4\frac{1}{4}$ to $4\frac{2}{3}$ in length of head, $1\frac{1}{2}$ diameters from end of snout, and $1\frac{1}{4}$ apart. The maxilla reaches to below the first third of the orbit. The third suborbital bone varies in depth from being equal to twice as high as the uncovered portion of the cheek below it. Open pores on the snout and lower jaw in the adult or even in the young in examples from hilly districts, sometimes pores on preorbital. Axillary process broad, lancet-shaped, and longer in some examples than in others. *Barbels*—four, generally short, the rostral pair occasionally absent. *Teeth*—pharyngeal, 5, 4, 2/2, 4, 5. *Fins*—dorsal higher than its base is long, it commences nearer to the base of the caudal fin than to the snout, and does not extend to over the anal. Pectoral may or may not reach the ventral; its outer six rays are thickened and very stiff in some examples, especially males from the hills. The ventral in some does, in others does not reach the vent. Caudal forked, lower lobe usually slightly the longer. *Scales*—$2\frac{1}{2}$ to $3\frac{1}{2}$ rows between lateral line and base of ventral fin; 20 rows before base of dorsal. *Colour*—silvery, shot with purple; back of a slaty grey, descending in bars towards the lateral line, most distinct in immature specimens. In adults these bars become indistinct and sometimes lost. Each scale in adults with a black spot at its base, and two on each scale forming the lateral line, but no spots in the young. Fins whitish, tinged with orange. A grey margin to the dorsal and caudal, the lower lobe of which is sometimes stained black. Shoulder-process black-edged.

This fish shows considerable alterations in colour and form as it gets older, there are likewise individual variations that have been considered species.

Variety *cocsa* (*Cyprinus cocsa*, Ham. Buch.) shows rather a deep third suborbital bone, the eyes a little larger; the dorsal, pectoral, and ventral not so developed as in the next variety. The size of the axillary process and the presence or absence of bars on the back are subject to individual variation.

Variety *chedra* (*C. chedra*, Ham. Buch.) has the third suborbital less deep than in the preceding form, the dorsal, pectoral, and ventral more developed, and the axillary process larger. The outer pectoral rays are very stiff.

The ova of this species are large; I found the fish breeding at Cuttack, in the month of November.

Hab. Assam and Himalayas, through the continent of India as far as the Western Ghats, not recorded from the coast of Malabar or Canara nor from Sind. Found also in Ceylon, whence Dr. Kelaart brought some specimens to the museum of the East-India Company. The species attains at least 6 inches in length.

427. (6.) Barilius barila.

Cyprinus barila, *Ham. Buch. Fish. Gang.* pp. 267, 384.
Barilius barila, *Day, Fish. India*, p. 591, pl. cxlviii, fig. 4 (see synon.).

Gilland and *Caedra*, Beng.; *Persee*, Hind.

B. iii. D. 9 (2/7). P. 13. V. 9. A. 13–14 (3/10–11). C. 19. L. l. 43–46. L. tr. 7/5.

Length of head 5 to $5\frac{1}{2}$, height of body $5\frac{1}{4}$ to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{3}{4}$ to 1 diameter from end of snout and also apart. The posterior extremity of the maxilla reaches to below the anterior third of the orbit. Third suborbital bone wide and nearly touching the preopercular ridge. *Barbels*—a small rostral pair. *Teeth*—pharyngeal, crooked, pointed, 5, 4, 3/3, 4, 5. *Fins*—dorsal almost entirely in advance of anal. The pectoral is nearly as long as the head, but does not quite reach the ventral. *Scales*—$1\frac{1}{2}$ to 2 rows between lateral line and base of ventral; 18 rows before the dorsal. *Colour*—silvery, with 14 or 15 vertical blue bands in the middle third of the side of the fish.

Hab. Delhi, N.W. and Central Provinces, Bengal, Orissa, and Lower Assam. Grows to 4 inches in length.

428. (7.) Barilius bakeri.

Barilius bakeri, *Day, P. Z. S.* 1865, p. 305; *Fish. India*, p. 591, pl. cli, fig. 2 (see synon.).

B. iii. D. 13 (3/10). P. 15. V. 9. A. 16–17 (2-3/14). C. 17. L. l. 38. L. tr. 9/4.

Length of head $4\frac{1}{4}$ to $4\frac{2}{3}$, height of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diameter from end of snout, $1\frac{1}{4}$ diameter apart. Lower jaw the longer, with a knob above the symphysis. The posterior extremity of the maxilla extends to nearly below the centre of the orbit. Suborbital ring of bones wide, the third almost entirely covering the cheek. Some pores exist along the margin of the lower lip, on the snout, and on the anterior edge of the preorbital. *Barbels*—absent. *Teeth*—pharyngeal, curved and pointed, 5, 4, 2/2, 4, 5. *Fins*—dorsal extending to above the fourth anal ray; caudal forked. *Scales*—2 rows between lateral line and base of ventral fin. *Colour*—greyish, becoming white on the abdomen. A row of large bluish spots along the side. Dorsal, anal, and pectoral fins margined with white, and having dark grey bases. Caudal grey in the centre.

Hab. Hill-ranges of Travancore. Attaining 6 inches in length.

429. (8.) Barilius gatensis.

Leuciscus gatensis, *Cuv. & Val. H. N. Poiss.* xvii, p. 309, pl. 503.
Barilius gatensis, *Day, Fish. India*, p. 592, pl. cxlix, fig. 2 (see synon.).

Choaree (at Coonoor) and *Aart-candee* (Bhaváni), Tam. "River carp."

B. iii. D. 10–12 (2–3/8–9). P. 15. V. 9. A. 15–17 (3/12–14). C. 18. L. l. 39–40. L. tr. 8/5.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $4\frac{1}{2}$ in the length of head, 1 to $1\frac{1}{3}$ diameters from end of snout, $1\frac{1}{2}$ diameters apart. Cleft of mouth extending to below the centre of the orbit. The third suborbital is about three times as broad as the uncovered portion of the cheek below it. The anterior portion of the snout and the sides of the jaws covered with large glands; there are likewise some on the lower jaw. *Barbels*—two very minute pairs, which appear to be sometimes wanting. *Teeth*—pharyngeal, crooked, pointed, 5, 3 or 4, 2/2, 4 or 3, 5. *Fins*—dorsal commences midway between end of snout and middle of caudal fin, extending to above the third anal ray. Pectoral as long as the head excluding the snout, its outer ray stiff. Caudal moderately lobed. *Scales*—$2\frac{1}{2}$ rows between lateral line aud base of ventral. *Colour*—silvery grey, with about 15 vertical bars descending from the back, and becoming more or less broken up in the adult. Dorsal and anal with dark bases and light margins. The females and young generally have smooth scales, whereas most of the adult males have one or more rough spots on each.

Hab. Western Ghats of Malabar and Nilgiri hills, up to about 5000 feet above the level of the sea; attaining at least 6 inches in length.

430. (9.) Barilius canarensis.

Opsarius canarensis, *Jerdon, Mad. Jour. L. S.* xv, 1849, p. 329.
Barilius canarensis, *Day, Fish. India*, p. 592, pl. cxlix, fig. 1 (see synon.).

B. iii. D. 12–13 (2/10–11). P. 15. V. 9. A. 14–16 (2/12–14). C. 21. L. l. 38. L. tr. 9/4.

Length of head $4\frac{1}{2}$ to $4\frac{3}{4}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diameter from end of snout and also apart. Suborbitals nearly cover the cheek. The posterior extremity of the maxilla reaches to below the anterior third of the orbit. *Barbels*—absent. *Fins*—dorsal commences midway between snout and base of caudal. *Scales*—$2\frac{1}{2}$ rows between lateral line and base of ventral; 15 rows before dorsal. Gill-rakers distinct. *Colour*—greenish above, golden on the sides, *a single or double row of large vertical green spots along* the body. Fins grey, with broad white margins.

Hab. Canara and Malabar on the western coast; attaining 6 inches in length.

431. (10.) Barilius barna.

Cyprinus barna, *Ham. Buch. Fish. Ganges*, pp. 268, 384.
Barilius barna, *Day, Fish. India*, p. 592, pl. cxlviii, fig. 1 young, and fig. 2 adult (see synon.).

Bahri, Ooriah; *Balisundree* and *Oz-o-la*, Assam.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 13–14 (3/10–11). C. 19. L. l. 39–42. L. tr. 8–9/6.

Length of head $4\frac{3}{4}$ to $5\frac{1}{4}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $3\frac{1}{2}$ in the length of the head, two thirds to one diameter from the end of snout, and $1\frac{1}{3}$ apart. Third suborbital bone thrice as deep as the uncovered portion of the cheek below it. The maxilla reaches to beneath the first third of the orbit; the adult has open pores on both jaws and snout. Axillary process reaches to above base of pectoral fin. *Barbels*—absent. *Fins*—dorsal varies considerably, commencing midway between the eye and the base of the caudal fin, it is elevated in some specimens but not in others, while the last ray may extend (especially in the young) almost to the base of the caudal fin. The pectoral reaches to above the ventral, and in the young has its outer rays thickened. The ventral does not extend to the anal in the young, its inner rays are very thick. Anal commences under the middle or end of the dorsal fin. *Scales*—$2\frac{1}{2}$ rows between lateral line and base of ventral fin; 16 rows before base of dorsal. *Colour*—dull green in the adult, with from 9 to 11 vertical dark bands on the body; dorsal and caudal fins edged with black. The young have the back grey, the sides silvery shot with gold, and

from 7 to 9 narrow deep blue vertical bands. Fins yellow, the dorsal and caudal stained externally with black.

Hab. Assam, the Ganges and its branches, Bengal and Orissa; attaining 5 inches or more in length.

432. (11.) Barilius guttatus.

Opsarius guttatus, *Day, P. Z. S.* 1869, p. 620.
Barilius guttatus, *Day, Fish. India*, p. 593, pl. cxlix, fig. 3 (see synon.).

Nga-la-wah, Burm.

B. iii. D. 9 (2/7). P. 15. V. 9. A. 14 (3/11). C. 17.
L. l. 44–48. L. tr. 9/5.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter 4 to 5 in the length of the head, 1 to $1\frac{1}{4}$ diameters from the end of the snout and apart. Cleft of mouth deep, extending nearly 1 diameter behind the orbit. Upper jaw the longer; a well-developed knob above symphysis of lower jaw. Suborbitals very broad, especially the hindermost, which is nearly behind the vertical from the posterior margin of the orbit, and almost covers the cheek. *Barbels*—a rudimentary rostral or maxillary pair may be present. *Fins*—dorsal commences midway between posterior extremity of orbit and base of caudal, being opposite the interspace between the ventral and anal fins. Caudal forked, lower lobe slightly the longer. *Lateral line*—complete, 2 rows of scales between it and the ventral fin; 23 rows before the base of the dorsal fin. *Colour*—silvery shot with purple, one or two rows of blue spots along the side. Lower caudal lobe orange, upper lobe with a dark edging, and a dark band along the upper half of the lower lobe.

Hab. Irrawaddi from Prome to Mandalay; attaining at least 7 inches in length.

433. (12.) Barilius tileo.

Cyprinus tileo, *Ham. Buch. Fish. Ganges*, p. 276.
Barilius tileo, *Day, Fish. India*, p. 593, pl. cxlix, fig. 5 (see synon.).

Tilei, Sel-len, Boolla, and *Sund-u-a-rie*, Assam.

B. iii. D. 9 (2/7). P. 14. V. 9. A. 13 (3/10). C. 20.
L. l. 70–75. L. tr. 14/7.

Length of head $4\frac{3}{4}$ to $5\frac{1}{4}$, height of body $4\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{3}$ diameters from end of snout, and $1\frac{1}{2}$ apart. Abdominal profile more convex than the dorsal. Head compressed, snout pointed. Upper jaw slightly the longer when the mouth is closed; symphysial knob not developed. The posterior extremity of the maxilla reaches to beneath the middle of the eye. Suborbital ring of bones broad, the third being about equal to twice the extent of the uncovered portion of the cheek below it. Axillary process well-developed,

having a soft scaled prolongation. *Barbels*—rudimentary or entirely absent. *Fins*—dorsal commences midway between the hind edge of the eye and the base of the caudal fin, the anal being behind the vertical from the last dorsal ray. Pectoral as long as the head excluding the snout. Caudal deeply forked. *Scales*—$3\frac{1}{2}$ to $4\frac{1}{2}$ rows between lateral line and base of ventral; 30 rows before base of dorsal. *Colour*—bluish along the back, becoming silvery on the sides and beneath; two or more rows of blue spots and blotches, having a vertical character, along the sides. Dorsal and caudal fins dark grey, with a light pinkish edge; the other fins yellowish.

Hab. Bengal and Assam; attaining at least 5 inches in length.

434. (13.) Barilius evezardi.

Barilius evezardi, *Day, J. A. S. B.* xli, 1872, pt. ii, p. 326; *Fish. India*, p. 593, pl. cxlviii, fig. 6 (see synon.).

B. iii. D. 9 (2/7). P. 13. V. 9. A. 14–15 (2/12–13). C. 19. L. l. 40. L. tr. 6–7/4.

Length of head $5\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes—diameter 3 in the length of the head, $\frac{3}{4}$ of a diameter* from end of snout, and 1 apart. Snout compressed; lower jaw slightly the longer and with a well-developed knob at the symphysis; the maxilla reaches to below the front edge of the eye. Suborbital ring of bones rather wide, the third being more than twice as deep as the uncovered portion of the cheek below it. *Barbels*—absent. *Teeth*—pharyngeal, curved, pointed, 5, 3/3, 5. *Fins*—the dorsal commences about midway between the hind edge of the orbit and the posterior end of the caudal fin, the last half being above the anal. Pectoral as long as the head. Caudal forked. *Scales*—2 rows between lateral line and base of ventral. *Colour*—silvery, of a brown tint along the back, and a lateral burnished silvery band. Dorsal, caudal, and anal fins orange, the first two edged with black.

Hab. Poona; up to $4\frac{1}{2}$ inches in length.

435. (14.) Barilius bola. (Fig. 110.)

Cyprinus bola, *Ham. Buch. Fish. Ganges*, pp. 274, 285.
Barilius bola, *Day, Fish. India*, p. 594, pl. cxlix, fig. 4 (see synon.).

Bugguah, Ooriah; *Korang*, Assam; *Bola*, Beng.; *Buggarah*, Hind.

B. iii. D. 10–11 (3/7–8). P. 13. V. 9. A. 13 (3/10). C. 19. L. l. 88–94. L. tr. 12–15/9–11.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body 5 to 6 in the total length. *Eyes*—before the middle of the length of the head, diameter $4\frac{1}{2}$ to 7 in the length of head, $1\frac{1}{3}$ to 2 diameters from end of snout and apart. Snout pointed, a well-developed knob above symphysis of the lower jaw. Suborbital ring of bones wide, especially the third, which is wider than the opercle, the width of

eye and the hind edge of the opercle. Mouth deeply cleft, the posterior extremity of the maxilla extending nearly one diameter of the orbit behind the posterior margin of the eye. *Barbels*—

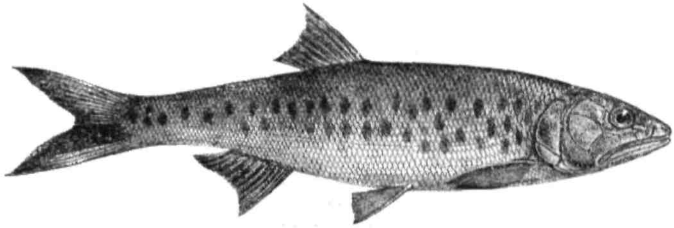

Fig. 110.—*Barilius bola.*

absent. *Fins*—dorsal fin one third higher than long; it commences midway between the angle of the preopercle and the base of the caudal, its last ray being scarcely over the first of the anal. Caudal lobed. *Scales*—4½ to 5 rows between lateral line and base of ventral; 40 rows before base of dorsal. *Colour*—silvery, with two or more rows of vertical bluish blotches along the sides, the upper row with twelve to twenty blotches, and the lower intermediate; some spots also on the head. Lower half of the dorsal fin slightly grey. Caudal orange, stained with grey and black. Pectoral, ventral, and anal orange, the colours being somewhat similar to those of a trout; it often goes by that name amongst Europeans.

Hab. Orissa, Bengal, N.W. Provinces, Assam, and Burma; attaining at least a foot in length; one killed in Assam by Mr. Hannay is stated to have weighed 5 lb. A very game fish, takes the fly well, and is one of those termed *Rajah mas*, or "chief of the fishes," in the Assam rivers *.

25. Genus **DANIO**, Hamilton Buchanan.

Syn. *Perilampus*, sp., McClell.; *Paradanio* and *Devario*, Bleeker.

Body compressed, abdomen rounded. Pseudobranchiæ present. Cleft of mouth shallow, directed obliquely upwards, the end of the lower jaw usually forming a portion of the dorsal profile. Suborbitals broad. Barbels four, or two, or none. Pharyngeal teeth hooked, generally 5, 3, 2/2, 3, 5. Dorsal fin moderately elongated, its posterior rays being opposite the anal, which is long. Scales of moderate size. Lateral line concave, passing to the lower half of the tail. Gill-rakers short.

Geographical Distribution. These prettily marked little fish are found throughout India, Burma, and Ceylon.

* *Tinca vulgaris*, Cuvier, the Tench, has been introduced into the waters of the Nilgiri hills and is thriving around Ootacamund.

Synopsis of Indian Species.

D. 18–19, A. 18–19, L. l. 41–48. No barbels	1. *D. devario*, p. 354.
D. 15–16, A. 19–20, L. l. 55–65. No barbels, or a short rostral pair. One or two spines on the margin of the orbit	2. *D. spinosus*, p. 355.
D. 12–15, A. 15–19, L. l. 35–37. Rostral and sometimes rudimentary maxillary barbels	3. *D. malabaricus*, p. 355.
D. 12–14, A. 14–16, L. l. 32–34. Rostral and maxillary barbels	4. *D. æquipinnatus*, p. 356.
D. 11–13, A. 17–18. Two pairs of long barbels	5. *D. dangila*, p. 356.
D. 13, A. 18. No barbels	6. *D. chrysops*, p. 357.
D. 12–14, A. 13–14, L. l. 35–37. Rostral and sometimes maxillary barbels	7. *D. neilgherriensis*, p. 357.
D. 9, A. 15–16, L. l. 26–28. Long rostral and usually maxillary barbels. Blue bands	8. *D. rerio*, p. 358.
D. 9, A. 13–15, L. l. 31–33. Two pairs of long barbels. A scarlet horizontal band	9. *D. albolineatus*, p. 358.
D. 9, A. 13, L. l. 30–32. Maxillary barbels only. Blue bands	10. *D. nigrofasciatus*, p. 359.

436. (1.) Danio devario.

Cyprinus devario, *Ham. Buch. Fish. Ganges*, pp. 341, 393, pl. 6, fig. 94.
Danio devario, *Day, Fish. India*, p. 595, pl. cl, fig. 4 (see synon.).

Bonkuaso, Ooriah; *Debari*, Beng.; *Da-bah* and *Duth-ri-e*, N.W. Provinces; *Khan-ge*, *Maal-le* and *Pur-ran-dah*, Punj.; *Chay-la-ree*, Sind.

B. iii. D. 18–19. A. 18–19. C. 19. L. l. 41–48. L. tr. 11/5.

Length of head 5 to $5\frac{1}{4}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ (or even 4) in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ of a diameter from end of snout, $1\frac{1}{4}$ diameters apart. Posterior extremity of maxilla extends beneath anterior margin of the orbit; lower jaw the longer. Third suborbital bone broad. *Barbels*—absent. *Fins*—dorsal commences midway between the anterior margin of the orbit and the base of caudal. Caudal lunate. *Scales*—$2\frac{1}{2}$ rows between lateral line and base of ventral fin; 16 rows before base of dorsal. *Colour*—greenish above, silvery white below. The anterior part of the body is reticulated in its centre by steel-blue lines, divided from one another by narrow vertical yellow bands. Three bluish lines, divided by yellow ones, are continued backwards to the caudal fin, where the two lower amalgamate, and, passing upwards, become lost on the superior half of the fin.

Hab. Sind, Orissa, Bengal, N.W. Provinces, Deccan, Punjab, and Assam; attaining 4 inches in length.

437. (2.) Danio spinosus.

Danio spinosus, *Day, P. Z. S.* 1869, p. 621; *id. Fish. India*, p. 595, pl. cl, fig. 6.

B. iii. D. 15–16. A. 19–20. C. 19. L. l. 55–65. L. tr. 12–14/4.

Length of head 5 to $5\frac{1}{4}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diameter from end of snout and also apart. Body strongly compressed. Lower jaw prominent. Third suborbital bone wide and touching the preopercular ridge. In the adult there is a sharp spine directed forwards above the anterior upper margin of the orbit, and a second, broader and blunter before the centre of the eye, on the preorbital. In immature examples these spines are equally sharp. *Barbels*—a small rostral pair. *Fins*—the first five or six dorsal rays are in advance of the anal. Pectoral as long as the head. Caudal lunate. *Scales*—$3\frac{1}{2}$ rows between lateral line and base of ventral. *Colour*—silvery, with an ill-defined lateral band, and some vertical yellow lines in the anterior half of the body. Dorsal and anal greyish, with reddish margins anteriorly. In the immature there is a dark humeral spot, and a steel-blue lateral band goes to the centre of the caudal fin, which has a scarlet stripe along the last half of its centre. Some examples have a wide blue central band and two narrow parallel ones superiorly, and the same number inferiorly; they are divided by yellow ground-colour.

Hab. Burma; attaining at least 4 inches in length.

438. (3.) Danio malabaricus.

Perilampus malabaricus, *Jerdon, Mad. Jour. L. S.* xv, 1849, p. 325.
Danio malabaricus, *Day, Fish. India*, p. 595, pl. cl, fig. 7 (see synon.).

Nooltoo and *Chela purroovoo*, Tamil.

B. iii. D. 12–15. A. 15–19. C. 19. L. l. 35–37. L. tr. $7\frac{1}{2}$–8/3.

Length of head 5 to $5\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 diameter from end of snout, and $1\frac{1}{3}$ apart. The third suborbital bone nearly touches the preopercular ridge. *Barbels*—rostral half as long as the orbit, maxillary very short; in some specimens the latter are entirely absent. *Fins*—the dorsal arises midway between the base of the caudal fin and the posterior edge of the eye; its anterior half is in advance of the anal. *Colour*—back steel-blue, some irregular vertical yellow lines on the fore part of the body, and three or four blue bands along the sides, the central ones coalescing so as to form a broad bluish band along the middle of the caudal fin.

Hab. Western coast of India and Ceylon; attaining 6 inches in length.

439. (4.) Danio æquipinnatus. (Fig. 111.)

Perilampus æquipinnatus, *McClelland, As. Res.* xix, pt. 2; *Ind. Cyp.* p. 393, pl. 60, fig. 1.
Danio æquipinnatus, *Day, Fish. India*, p. 596, pl. cl, fig. 5 (see synon.).

B. iii. D. 12–14. A. 14–16. C. 19. L. l. 32–34. L. tr. 6–7/3½.

Length of head 5, height of body 4 to 4¼ in the total length. *Eyes*—diameter 3½ to 4 in length of head, 1 diameter from end of snout, and 1½ apart. The third suborbital bone nearly touches the preopercular ridge. Cleft of mouth oblique and extending to

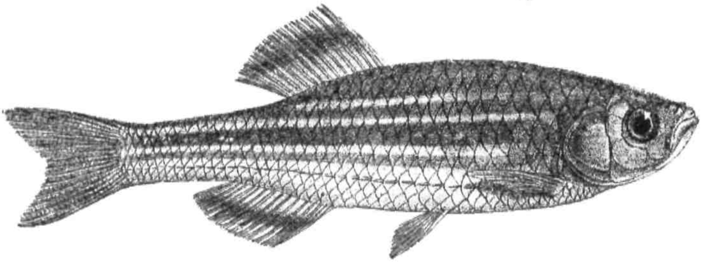

Fig. 111.—*Danio æquipinnatus.*

under the anterior margin of the orbit; a bluntish knob at the symphysis. *Barbels*—rostral half as long as the orbit; maxillary minute. *Fins*—the dorsal arises midway between the centre of the orbit and the base of the caudal fin, extending to over the anterior anal rays; it is two thirds as high as the body. Pectoral as long as the head without the snout, nearly reaching the ventral, which last does not extend as far as the anal. Caudal forked, but not deeply so. *Scales*—1½ rows between lateral line and base of ventral fin; 13 rows before the dorsal fin. *Colour*—yellowish white: a wide bluish band extends along the body from the eye to the centre of the base of the caudal fin; in its course are sometimes several round silvery spots: below it is another narrow band (which occasionally joins the central one anteriorly); there are two other lighter bands above the central one. The intermediate ground-colour is yellow. Fins yellowish. Dorsal and anal fins each with a broad bluish band along their outer half. In some specimens there is a dark mark behind the gill-opening.

Hab. Himalayas at Darjeeling and the whole of the Assam district as high as Sadiya, the Naga and Garo hills, Tenasserim and the Deccan.

440. (5.) Danio dangila.

Cyprinus dangila, *Ham. Buch. Fish. Ganges*, pp. 321, 390.
Danio dangila, *Day, Fish. India*, p. 596, pl. cl, fig. 3 (see synon.).

B. iii. D. 11–13. A. 17–18. C. 20. L. l. 38. L. tr. 7/4½.

Length of head 5, height of body 3½ to 4 in the total length. *Eyes*—diameter 3 in length of head, ¾ of a diameter from end of snout. Lower jaw the longer, with a knob at the symphysis. *Barbels*—rostral a little shorter than the head; maxillary pair slightly longer. *Fins*—the posterior dorsal rays are above the anterior anal. Caudal slightly emarginate. *Scales*—2½ rows between lateral line and base of ventral: 18 rows before dorsal fin. *Colour*—back olive, abdomen silvery, sides with several narrow blue lines, which in the anterior half or two thirds of the body form a beautiful network: a dark spot behind gill-covers. Anal fin with two or three blue stripes.

Hab. Bengal, Behar, Himalayas at Darjeeling, also the hills above Akyab; grows to 5 or 6 inches in length.

441. (6.) Danio chrysops.

Leuciscus chrysops, *Cuv. & Val. H. N. Poiss.* xvii, p. 308.
Danio chrysops, *Day, Fish. India*, p. 596 (see synon.).

B. iii. D. 13 (3/10). A. 18 (3/15). C. 19. L. l. 45. L. tr. 8½/4.

Length of head 4⅔, height of body 4 in the total length. *Eyes*—diameter 2⅔ in length of head, ½ a diameter from end of snout, and 1 apart. Snout obtuse; upper jaw slightly the longer. Third suborbital bone nearly as wide as the uncovered portion of the cheek below it. Dorsal profile rather more convex than that of the abdomen. *Fins*—the dorsal commences midway between the middle of the eye and base of the caudal fin; it is entirely in advance of the anal, and two thirds as high as the body below it. *Lateral line*—curves downwards in the pectoral region, whence it proceeds direct to the centre of the base of the caudal. *Colour*—silvery, the upper two thirds of the body darker than the lower.

Hab. Bengal.

442. (7.) Danio neilgherriensis.

Paradanio neilgherriensis, *Day, P. Z. S.* 1867, p. 296.
Danio neilgherriensis, *Day, Fish. India*, p. 597, pl. cl, fig. 2 (see synon.).

Cowlie, Tamil.

B. iii. D. 12–14 (3/9–11). P. 15. V. 7. A. 13–14 (2/11–12). C. 19. L. l. 35–37. L. tr. 6–7/4. Vert. 12/20.

Length of head 4½ to 5, height of body 4 to 4¼ in the total length. *Eyes*—diameter 3 to 3½ in the length of head, ⅔ of a diameter from end of snout, 1¼ diameters apart. Abdominal profile more convex than the dorsal. The maxilla reaches to below the front edge of the eye. Lower jaw anterior, with a

slight knob at its extremity. The third suborbital bone almost touches the preopercular ridge. *Barbels*—a short rostral pair, and sometimes rudimentary maxillary ones. *Teeth*—pharyngeal, crooked, pointed, 5, 4, 2/2, 4, 5. *Fins*—the dorsal extends to above the fourth or fifth anal ray. Caudal forked. *Scales*—15 rows before the base of the dorsal fin. *Colour*—back greenish, sides silvery, with a purplish tinge along the abdomen; a badly-marked broad, steel-blue stripe, bounded above and below by a narrow yellow edging, extends from behind the eye to the caudal fin. The *young* usually have light horizontal bands.

Hab. Rivers on the Nilgiri (Neilgherry) Hills; attaining $3\frac{1}{2}$ inches in length.

443. (8.) Danio rerio.

Cyprinus rerio, *Ham. Buch. Fish. Ganges*, pp. 323, 390.
Danio rerio, *Day, Fish. India*, p. 597, pl. cli, fig. 4 (see synon.).

Poncha-geraldi, Ooriah.

B. iii. D. 9 (2/7). A. 15–16 (2–3/12–13). C. 19. L. l. 26–28. L. tr. 6.

Length of head 5 to $5\frac{1}{4}$, height of body $4\frac{2}{3}$ to 5 in the total length. *Eyes*—diameter about 3 in length of head, $\frac{1}{2}$ a diameter from end of snout, and 1 diameter apart. Lower jaw the longer. *Barbels*—rostral short, maxillary reaching end of opercle. *Teeth*—pharyngeal, crooked, pointed, 5, 3, 1/1, 3, 5. *Fins*—dorsal commencing opposite the anal, and situated in the middle of the total length: it and the anal highest anteriorly; caudal deeply forked. *Lateral line*—absent. *Colour*—four metallic blue lines along the sides (separated by three narrow silvery ones), and forming three bands on the caudal fin. Dorsal with a blue edging. Anal with three longitudinal blue bands.

Hab. Bengal, and as low down the Coromandel coast as Masulipatam. It attains to about 2 inches in length.

444. (9.) Danio albolineatus.

Nuria albolineata, *Blyth, J. A. S. B.* xxix, 1860, p. 163.
Danio albolineata, *Day, Fish. India*, p. 597, pl. cl, fig. 1 (see synon.).

B. iii. D. 9 (2/7). A. 13–15 (2/11–13). C. 19. L. l. 31–33. L. tr. $5\frac{1}{2}$/3.

Length of head $4\frac{1}{2}$, height of body from 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in the length of head, $\frac{3}{4}$ of a diameter from end of snout, and 1 apart. Body moderately compressed. Lower jaw anterior; the maxilla extends to below the front edge of the orbit. *Barbels*—maxillary reach beyond the base of the pectoral fin; rostral ones to the posterior margin of the orbit. *Teeth*—pharyngeal 5, 4, 2/2, 4, 5. *Fins*—dorsal commences slightly in advance of the anal. Caudal fin emarginate. *Lateral line*—incomplete, $1\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 16 rows before the base of the dorsal fin. *Colour*—greenish superiorly; a scarlet band with a

dark lower edge commences from below the base of the dorsal fin, gradually widens, and is continued to the centre of the base of the caudal. Dorsal margined with red. Anal with a yellow stripe along its centre.

Hab. Moulmein in tanks and streams; attaining 2 inches in length.

445. (10.) **Danio nigrofasciatus.**

Barilius nigrofasciatus, *Day, P. Z. S.* 1869, p. 620.
Danio nigrofasciatus, *Day, Fish. India*, p. 597.

B.iii. D.9(2/7). P.15. V.7. A.13(2/11). C.19. L.l.30–32. L.tr.7.

Length of head $5\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter nearly $\frac{1}{2}$ of length of head, $\frac{3}{4}$ of a diameter from end of snout, 1 diameter apart. *Barbels*—rostral absent; the maxillary pair extend to below the orbit. *Fins*—dorsal situated over the first portion of the anal, and midway between the posterior extremity of the orbit and the base of the caudal, which is lunate. *Lateral line*—absent. *Colour*—a dark band passing along the side of the body, and a second dotted line below it. Dorsal and anal spotted with black in lines. In some specimens the body is intensely blue.

Hab. Pegu and Moulmein; not exceeding an inch in length.

26. Genus **PERILAMPUS**, McClelland.

Syn. *Chela*, Swainson; *Laubuca*, Bleeker; *Cachius* and *Eustira*, Günther.

Pseudobranchiæ present. Body oblong, compressed, with a cutting abdominal edge. Mouth directed obliquely upward. Barbels absent. Pharyngeal teeth in three rows, 5, 4 or 3, 2 or 1/1 or 2, 3 or 4, 5, uncinate. Dorsal fin rather short, without any osseous ray, and commencing opposite or behind the origin of the anal, which last has many rays. Outer ventral ray elongate. Scales of moderate size. Lateral line concave, passing to the lower half of the base of the caudal fin.

Geographical Distribution. Fresh waters of India, Ceylon, and Burma.

Synopsis of Indian Species.

D. 9, A. 22–24, L. l. 55-65	1. *P. atpar*, p. 359.
D. 10–11, A. 19–23, L. l. 34–37	2. *P. laubuca*, p. 360.
D. 12, A. 17, L. l. 35	3. *P. ceylonensis*, p. 361.

446. (1.) **Perilampus atpar.**

Cyprinus atpar, *Ham. Buch. Fish. Ganges*, pp. 259, 384.
Perilampus atpar, *Day, Fish. India*, p. 598, pl. cli, fig. 6 (see synon.).

Bonkuaso, Ooriah; *Nga-man-dan*, and *Ya-paw-nga* and *Nga-phyin-gyan*, Burmese; *Kachhi*, Beng.; *Mor-ri-ah*, Punj.; *Bi-dah*, Sind.

B. iii. D. 9 (2/7). A. 22–24 (2–3/18–21). L. l. 55–65. L. tr. 10–13/4.

Length of head $5\frac{1}{2}$ to 6, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 3 to 4 in length of head, $\frac{3}{4}$ of a diameter from end of snout, $1\frac{1}{2}$ diameters apart. Cleft of mouth oblique, extending to nearly beneath the margin of orbit. *Teeth*—pharyngeal, 5, 4, 1/1, 4, 5, crooked, pointed. *Fins*—dorsal commences opposite the beginning of the second third of the anal. Pectoral elongate. Ventral with an elongated outer ray extending to the middle or even end of the caudal fin. Caudal forked. *Scales*—4 rows between lateral line and base of ventral. *Colour*—silvery, with a burnished lateral band. Dorsal and caudal fins yellow.

Hab. Sind, throughout India and Burma; attaining 4 inches in length.

447. (2.) **Perilampus laubuca.** (Fig. 112.)

Cyprinus laubuca, *Ham. Buch. Fish. Ganges*, pp. 260, 384.
Perilampus laubuca, *Day, Fish. India*, p. 598, pl. cli, fig. 5 (see synon.).

Bankoe, Ooriah; *Nga-me-loung*, Burmese; *Layubuka* and *Dankena*, Beng.; *Dannahrah*, Hind.; *Moh-do-nee-konah* and *Her-bag-gi*, Assam; *Coon-che-li-e*, N.W. Prov.

B. iii. D. 10–11. P. 13. A. 19–23. C. 19. L. l. 34–37. L. tr. 6–7/5.

Length of head 5 to 6, height of body $3\frac{1}{2}$ to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, $\frac{3}{4}$ to 1 diameter from end of snout, $1\frac{1}{4}$ diameters apart. *Teeth*—pharyngeal, 5, 4, 1/1, 4, 5. *Fins*—dorsal arises slightly behind the origin of the anal. Pectoral reaching anal. Caudal deeply

Fig. 112.—*Perilampus laubuca.*

forked. *Lateral line*—curved downwards, $3\frac{1}{2}$ rows of scales between it and the base of the ventral fin. *Colour*—silvery, with some golden vertical stripes during life. Fine dots over the body and a black mark, shot with green, above the base of the pectoral

fin, and another at the base of the caudal; the last third of each lobe of the caudal fin in some, especially Burmese specimens, is tipped with black. The black spot on the side of the tail is absent in some examples.

Hab. Ganjam, Orissa, Bengal, Central India, Assam and Burma: attaining at least 3½ inches in length.

448. (3.) Perilampus ceylonensis.

Eustira ceylonensis, *Günther, Catal.* vii, p. 331.
Perilampus ceylonensis, *Day, Fish. India*, p. 599.

B. iii. D. 12 (2/10). A. 17 (2/15). C. 19. L. l. 35. L. tr. 7½/2.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter 3 in length of head, ¾ of a diameter from end of snout. Posterior extremity of maxilla extends to below the anterior margin of the orbit; lower jaw the longer. *Fins*—origin of dorsal opposite commencement of anal. Pectoral reaching the ventral. *Colour*—uniform silvery.

Hab. Ceylon; attaining to nearly 2 inches in length.

27. Genus CHELA*, Hamilton Buchanan.

Syn. *Oxygaster*, v. Hass.; *Leuciscus*, sp., Cuv. & Val.; *Salmophasia*, Swainson; *Macrochirichthys* and *Paralaubuca*, Bleeker.

Body rather elongate and compressed; abdominal edge cutting. Pseudobranchiæ present. Mouth directed somewhat upwards, with the lower jaw prominent, and generally with a knob above the symphysis. Barbels absent. Pharyngeal teeth hooked and slender, in two or three rows. Dorsal fin short, without any osseous ray, situated principally or entirely opposite the anal, which latter has an elongated base. Pectorals long. Caudal forked. Scales of moderate or small size. Lateral line concave.

Geographical Distribution. India (including the Punjab and Sind), Burma, and the Malay Archipelago.

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* Descriptions have been published by Hamilton Buchanan and Sykes of some small fishes belonging to this genus and to *Barilius*. As I am unable to recognize them with certainty, I place them in this note:—

1. *Cyprinus hoalius*, Ham. Buch. Fish. Ganges, pp. 336, 392; *Leuciscus hoalius*, Bleeker, Beng. p. 68.—D. 9, V. 9, A. 10. Much compressed. Green above, silvery below. Northern Bengal; growing to 5 inches in length.

2. *Cyprinus borelio*, Ham. Buch. *l. c.* pp. 336, 392; *Leuciscus borelio*, Bleeker, Beng. p. 66.—D. 9, V. 8, A. 11, C. 18. Long and compressed. Silvery above tinged with green; deep yellow below. Eyes silvery. Gangetic Provinces, growing to 4 inches. This may belong to genus *Barilius*, and be the young of *B. bendelisis*.

3. *Cyprinus solio*, H. Buch. *l. c.* pp. 337, 392; *Leuciscus solio*, Bleeker, Beng. p. 68.—D. 9, V. 8, A. 11. Only differs from last in colour of belly. Kosi river. This and the last are probably the same.

4. *Chela jorah*, Sykes, T. Z. S. ii, p. 361; *Leuciscus jorah*, Bleeker, Beng.

Synopsis of Indian Species.

A. Bones of forearm support the edge of thorax (*Oxygaster*).
 D. 9–10, A. 15–16, L. l. 140–160, L. tr. 18–20/18 .... 1. *C. gora*, p. 362.

B. Bones of forearm do not support the edge of thorax (*Securicula*).
 D. 10, A. 20–21, L. l. 65–68, L. tr. 10/8 .. 2. *C. sladoni*, p. 363.
 D. 9, A. 21, L. l. 48, L. tr. 7½/4 .... 3. *C. sardinella*, p. 363.
 D. 9, A. 17–19, L. l. 55–65, L. tr. 7–9/5 .. 4. *C. untrahi*, p. 364.
 D. 9–10, A. 17–19, L. l. 43–45, L. tr. 6½–7/3 5. *C. argentea*, p. 364.
 D. 9, A. 16–17, L. l. 90–110, L. tr. 12/9 .. 6. *C. punjabensis*, p. 365.
 D. 9, A. 18–20, L. l. 80–87, L. tr. 12–15/6. 7. *C. phulo*, p. 365.
 D. 9–10, A. 14–15, L. l. 38–40, L. tr. 6–6½/3 .... 8. *C. boopis*, p. 366.
 D. 9, A. 13–15, L. l. 80–93, L. tr. 12–15/6. 9. *C. clupeoides*, p. 366.
 D. 9, A. 13–15, L. l. 86–110, L. tr. 17–19/6. 10. *C. bacaila*, p. 367.

449. (1.) Chela gora.

Cyprinus gora, *Ham. Buch. Fish. Ganges*, pp. 263, 384.
Chela gora, *Day, Fish. India*, p. 600, pl. cli, fig. 8 (see synon.).

Hum-catchari, Ooriah; *Ghora chela*, Beng.; *Chel-hul*, Hind.; *Bounchi* and *Kundul*, Punj.

B. iii. D. 9–10. A. 15–16. L. l. 140–160. L. tr. 18–20/18. Vert. 46.

Length of head 5 to 5¼, of caudal 6 to 6½, height of body 6 in the total length. *Eyes*—diameter ⅕ of length of head, 1½ diameters from end of snout, 1¼ diameters apart. The bones of the forearm support the thoracic edge, the keeled portion of the abdominal profile commences behind the ventral fin. Suborbital ring of bones broader than the diameter of the eye, but only covering two thirds of the cheek. *Teeth*—pharyngeal, 5, 3, 1/1, 3, 5. Gill-rakers very short, 8 in the lower branch of the outer branchial arch. *Fins*—dorsal commences slightly in advance of the anal, and in the last third of the distance between the hind edge of the preopercle and the base of the caudal fin. Pectoral one third longer than the head. *Scales*—extend forwards on the head to above the nostrils. *Colour*—silvery.

Hab. Sind, Punjab, N.W. Provinces, Bengal, Orissa, and Assam; attaining at least 9 inches in length.

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p. 68; Jerdon, Mad. Jour. L. Sc. 1849, p. 323.—D. 10, P. 12, V. 8, A. 11, C. 18. Compressed fish. Back dark, with purplish shade, sides and abdomen silvery. Beema river, near Pairgaon in the Deccan.

5. *Chela alkootee*, Sykes, *l. c.* p. 362; *Leuciscus alkootee*, Bleeker, Beng. p. 66; Jerdon, *l. c.* p. 324.—D. 10, P. 10, V. 7, A. 10. Sides slightly compressed, back and belly rounded (?); back straight. Scales very minute. Lateral line quite straight (?). Silvery, with a black circle round the eye. Deccan, attaining to 1 inch in length.

450. (2.) **Chela sladoni.** (Fig. 113.)

Chela sladoni, *Day, P. Z. S.* 1869, p. 622; *Fish. India*, p. 600, pl. clii, fig. 3.

B. iii. D. 10 (2/8). A. 20–21 (2/18–19). C. 21. L. l. 65–68. L. tr. 10/8.

Length of head 6 to $6\frac{1}{4}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ to $3\frac{1}{2}$ in the length of head, $\frac{3}{4}$ of a diameter from end of snout. Suborbital ring of bones half as deep as the diameter of the orbit, and two thirds wider than the uncovered portion of the cheek below it. The serrated

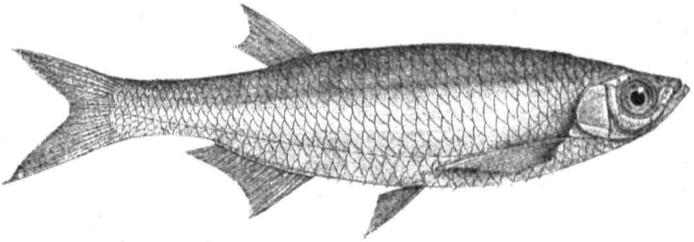

Fig. 113.—*Chela sladoni.*

abdominal margin commences opposite the base of the pectoral fin. *Teeth*—pharyngeal, crooked, 5, 4, 2/2, 4, 5. *Fins*—dorsal commences opposite anal. Pectoral as long as the head, but does not reach the ventral; lower caudal lobe the longer. *Colour*—silvery, caudal black-edged.

Hab. Irrawaddy in Burma, extending northwards as far as Mandalay.

451. (3.) **Chela sardinella.**

Leuciscus sardinella, *Cuv. & Val. H. N. Poiss.* xvii, p. 344.
Chela sardinella, *Day, Fish. India*, p. 600, pl. clii, fig. 1 (see synon.).

Nga-kooon-nyat, Burm.

B. iii. D. 9 (2/7). P. 13. V. 8. A. 21 (2/19). L. l. 48. L. tr. $7\frac{1}{2}$/4.

Length of head 6, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in the length of head, 1 diameter from end of snout, nearly 1 diameter apart. The maxilla extends to below the front edge of the eye. The keeled portion of the abdominal edge commences opposite the pectoral fin. Suborbital ring of bones broad, but does not touch the preopercular ridge. *Teeth*—pharyngeal, 5, 4, 3/3, 4, 5. *Fins*—dorsal commences above or slightly behind the origin of the anal. The pectoral does not reach the ventral, nor the latter the anal. Caudal deeply forked, the lower lobe the longer. *Colour*—silvery.

Hab. Irrawaddy river at Rangoon, also the Salween at Moulmein; attaining to at least 6 inches in length.

452. (4) Chela untrahi.

Chela untrahi, *Day, P. Z. S.* 1869, p. 381; *id. Fish. India,* p. 601, pl. cli, fig. 7.

Untrahi, Ooriah.

B. iii. D. 9. P. 13. V. 7. A. 17–19. C. 17. L. l. 55–65. L. tr. 7–9/5.

Length of head $5\frac{1}{2}$ to 6; height of body $5\frac{1}{4}$ to 6 in the total length. *Eyes*—upper margin near the profile, diameter 3 to $3\frac{1}{4}$ in the length of head, $\frac{2}{3}$ of a diameter from end of snout, nearly 1 diameter apart. Dorsal profile nearly horizontal; abdominal profile with a cutting-edge from opposite the base of the pectoral fin. Mouth very oblique, knob on symphysis minute. Lower jaw in advance of the upper, the maxilla extending to below the anterior margin of first third of the orbit. Suborbital ring of bones wide, but they do not touch the preopercular ridge. *Fins*—pectorals one third longer than the head, reaching ventrals. Dorsal arises midway between the posterior margin of the orbit and the posterior extremity of the caudal fin; anal commences below the middle of the dorsal. Caudal lobed. *Scales*—deciduous, extending forwards on the nape to opposite the middle of the orbit. *Lateral line*—curves downwards, 1 row of scales between it and base of ventral fin; 47 rows before the base of the dorsal fin. *Colour*—silvery.

Hab. Mahanadi river in Orissa; also the Cauvery and Coleroon in Southern India; attaining at least 8 inches in length.

453. (5.) Chela argentea.

Leuciscus acinaces, *Cuv. & Val. H. N. Poiss.* xvii, pl. 509 (not descrip. p. 347).

Chela argentea, *Day, P. Z. S.* 1867, p. 301; *Fish. India,* p. 601, pl. clii, fig. 2 (see synon.).

Chaya-vellache or *Vellachee-cundee,* Tam. (the White Carp).

B. iii. D. 9–10. P. 15. A. 17–19. C. 19. L. l. 43–45. L. tr. $6\frac{1}{2}$–7/3.

Length of head $5\frac{1}{2}$ to $5\frac{2}{3}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 diameter from end of snout and also apart. Cleft of mouth extending to below the anterior third of the orbit, a knob above symphysis of the lower jaw. Suborbital ring of bones broad and nearly covering the cheek, the third almost touching the preopercular ridge. *Teeth*—pharyngeal, curved, pointed, 5, 3, 2/2, 3, 5. *Fins*—dorsal situated over the commencement of the anal. Pectoral reaches the ventral. Caudal deeply lobed. *Lateral line*—descends gently for the first twelve scales, finally attaining the centre of the caudal; $1\frac{1}{2}$ rows of scales between it and the base of the ventral fin; 27 to 30 rows anterior to the dorsal fin. Free portion of tail one half longer than high at its base. *Colour*—silvery, with a lateral band which fades after death; caudal dark-edged, as is also occasionally the anal.

Hab. Bhaváni river at the base of the Nilgiris, Cauvery river and Mysore; attaining 6 inches in length.

454. (6.) Chela punjabensis.

Chela punjabensis, *Day, J. A. S. B.* xli, pt. ii, 1872, p. 25; *id. Fish. India*, p. 601, pl. cliii, fig. 2.

Took, Punj.

B. iii. D. 9(2/7). P. 11. A. 16–17. C. 19. L. l. 90–110. L. tr. 12/9.

Length of head 6, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{2}{3}$ in length of head, $\frac{1}{2}$ a diameter from end of snout. The posterior extremity of the maxilla extends to nearly beneath the anterior margin of the orbit. The suborbital ring of bones broad, and the third three times as deep as the uncovered portion of the cheek below it. Dorsal profile nearly horizontal; abdominal edge cutting from opposite the base of the pectoral fin. *Fins*—dorsal arises midway between the posterior margin of the opercle and the posterior extremity of the lobes of the caudal. Pectoral longer than the head, but does not quite reach the base of the ventral, which last fin only extends half the distance to the anal; the latter commences opposite the origin of the caudal. Lower lobe of caudal the longer. *Scales*—moderately deciduous; they extend forwards to opposite the suborbital ring of bones; there is a slight elevation along the centre of each; $5\frac{1}{2}$ rows between the lateral line and the base of the ventral fin. *Colour*—silvery, with a burnished silvery band along the side. Cheeks tinged with pink.

Hab. Lahore, in the Ravi river, also the Indus in Sind; attaining at least $2\frac{1}{2}$ inches in length.

455. (7.) Chela phulo.

Cyprinus phulo, *Ham. Buch. Fish. Ganges*, pp. 262, 384.
Chela phulo, *Day, Fish. India*, p. 602, pl. cliii, fig. 1 (see synon.).

Phul chela, Beng.; *Dunnahree*, Hind.; *Took* and *Bung-ka-charl*, Punj.; *Muk-ka*, Sind; *Sel-konah*, Assam.

B. iii. D. 9 (2/7). P. 13. A. 18–20. C. 19. L. l. 80–87. L. tr. 12–15/6.

Length of head $5\frac{1}{2}$, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, $\frac{1}{2}$ a diameter from end of snout, 1 diameter apart. Abdominal profile cutting behind the base of the pectoral fin. Third suborbital bone nearly as deep as the uncovered portion of the cheek below it. The maxilla extends to under the front margin of the orbit. *Fins*—dorsal commences opposite the origin of the anal. Caudal deeply forked, lower lobe the longer. *Lateral line*—curves gently downwards. *Colour*—silvery, with a bright silvery lateral band.

Hab. Assam, Bengal, Orissa, Central India, and the Deccan as far southwards as the Tungabhadra and Kistna rivers; attaining 5 inches or more in length.

456. (8.) Chela boopis.

Chela boopis, *Day, P. Z. S.* 1873, p. 708; *id. Fish. India*, p. 602, pl. clii, fig. 4 (see synon.).

Sampaji, Canar.

B.iii. D.9–10. P.15. V.9. A.14–15. C.21. L.l.38–40. L.tr.6–6½/3.

Length of head 5¼ to 5½, height of body 5 to 5¼ in the total length. *Eyes*—diameter 2½ to 3 in the length of the head, ¾ of a diameter from the end of snout and also apart. Cleft of the mouth extends to beneath the front edge of the orbit. Suborbital ring of bones almost covers the cheek. *Fins*—dorsal commences slightly in advance of the anal, but extends to over it. Caudal deeply forked. *Scales*—2 to 2½ rows between lateral line and base of ventral: 22 to 24 rows before the dorsal fin. *Colour*—silvery, with a burnished lateral band; dorsal, caudal, and anal edged with black.

Hab. South Canara and ? Mysore; attaining at least 5 inches in length.

457. (9.) Chela clupeoides.

Cyprinus clupeoides, *Bloch, Ich.* xii, p. 49, t. 408, fig. 2.
Chela clupeoides, *Day, Fish. India*, p. 602 (see synon.).

Vellachee candee and *Netteli*, Tam; *Alkut*, Maráthi.

B. iii. D. 9. P. 13. V. 9. A. 13–15. C. 19. L. l. 80–93. L. tr. 12–15/6.

Length of head 5½ to 5¾, height of body 5½* in the total length. *Eyes*—diameter 4 in length of head, 1 diameter from end of snout, ¾ of a diameter apart. A well-developed knob on symphysis; suborbital ring of bones wide, the third four fifths as deep as the uncovered portion of the cheek below it. The thorax, which has a smooth edge, is not supported by any dilated bones of the forearm. *Teeth*—pharyngeal, 5, 4, 2/2, 4, 5. *Fins*—dorsal, situated in the posterior two fifths of the body, and one half in advance of the anal. Pectoral one fourth longer than the head, but does not reach the ventral. Caudal lobed, the lower lobe the longer. *Scales*—deciduous and placed in sinuous rows; those on upper surface of the head extend forwards to opposite the hind edge of the orbit. *Scales*—2 rows between lateral line and base of ventral. *Colour*—silvery.

This species or variety is closely allied to *C. bacaila*, from which it is chiefly divided by the number of scales. In Cutch I found A. (2/11–13), L. l. 83–92, L. tr. 13–14/6; at Jubbulpore, on the Nerbudda, A. (2/12–13), L. l. 80–90, L. tr. 14–15/6; in the Deccan, A. (2/13–15), L. l. 84–93, L. tr. 13/6; at Madras,

* In some badly nourished examples I have seen the height of the body only equal to 7½ in the total length. Such are common at Madras in the dirty Coom river.

A. (2/11–13), L. l. 80–87, L. tr. 12–15/6; to the south of Madras, at the Cauvery river, A. (2/12–13), L. l. 80–91, L. tr. 14–15/6.

Hab. Cutch, Jubbulpore, Mysore, the Deccan, Madras Presidency, and Burma. This species attains at least 6 inches in length, and is very good eating.

458. (10.) Chela bacaila.

Cyprinus bacaila, *Ham. Buch. Fish. Ganges*, pp. 265, 384, pl. 8, fig. 76.

Chela bacaila, *Day, Fish. India*, p. 603, pl. clii, fig. 5 (see synon.).

Jellahri, Ooriah; *Chelliah*, Hind.; *Dántál*, Maráthi.

B. iii. D. 9. A. 13–15. C. 19. L. l. 86–110. L. tr. 17–19/6.

Length of head $5\frac{1}{4}$ to 6; height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—$3\frac{1}{2}$ to $3\frac{3}{4}$ in length of head, snout slightly longer than the eye; eyes 1 diameter apart. Cleft of mouth reaches to below the first fourth of the eye. Suborbital ring of bones broad, nearly covering the cheek. *Teeth*—pharyngeal, 5, 4, or 3, 2/2, 3, or 4, 5. *Fins*—first anal ray is below the middle of the dorsal fin; pectoral nearly reaches the ventral, whilst the latter does not quite extend to the anal. *Scales*—extend forwards on the head to nearly opposite the posterior margin of the orbit. *Colour*—uniform silvery.

This species or variety is restricted more to the Valley of the Ganges and its affluent streams, also to the Punjab and down the Indus. It is distinguished by the large number of its scales, which I have found as follows: Assam, A. 2/13–14, L. l. 102–108, L. tr. 18/6; Sone river, A. 2/12, L. l. 98, L. tr. 18/6; Orissa, A. 2/13–14, L. l. 86–98, L. tr. 14–18/6 (some of these appeared to be intermediate forms between this species and the last); Calcutta, A. 2/11–13, L. l. 90–110, L. tr. 17–19/6; Seharunpore, A. 2/11–12, L. l. 95–100, L. tr. 18–19/6; Sind, A. 2/11–12, L. l. 92–96, L. tr. 17–19/6. One specimen from Bezwarah had A. 2/15, L. l. 95, L. tr. 12/6.

Hab. Throughout India, except Malabar, Mysore, and Madras, and parts of the Deccan; attaining at least 7 inches in length.

Family V. CHIROCENTRIDÆ.

Pseudobranchiæ absent. Body much elongated and compressed. Margin of upper jaw formed by the premaxillaries mesially, and the maxillaries laterally. Opercular apparatus complete. Barbels absent. A single rayed dorsal fin belonging to the caudal portion of the vertebral column. Stomach with a blind sac: intestinal canal short and furnished internally with spiral folds. No pyloric appendages. Air-bladder present.

Only one genus is known of the *Chirocentridæ*, which extends through the Red Sea and the seas of India to the Malay Archipelago.

1. Genus **CHIROCENTRUS**, Cuvier.

Branchiostegals eight. Abdomen with a sharp but not serrated margin. Gill-membranes united for a short distance; gill-opening wide. Eyes subcutaneous. Cleft of mouth oblique and deep; the lower jaw the longer. A row of canines in the mandible, and a horizontal pair in the premaxillaries; minute teeth on the palatines, pterygoids, and tongue. A single short dorsal fin placed far backwards opposite to a long anal; an elongated osseous appendage in the axilla; ventrals very small. Scales thin, small, and deciduous. Air-bladder cellular.

459. (1.) **Chirocentrus dorab.** (Fig. 114.)

Clupea dorab, *Forsk. Descr. Anim.* p. 72, no. 108.
Chirocentrus dorab, *Day, Fish. India*, p. 652, pl. clxvi, fig. 3 (see synon.).

Mooloo-alley and *Kiru-wahlah*, Tam.; *Wahlah*, Tel.; *Kunda*, Ooriah; *Pussunt*, Baluchistan.

B. viii. D. 16–17. P. 14–15. V. 6–7. A. 31–36. C. 19.

Length of head $6\frac{1}{2}$ to $7\frac{1}{4}$, height of body $6\frac{1}{2}$ to 9 in the total length. *Eyes*—diameter $4\frac{1}{4}$ in length of head. Along the whole

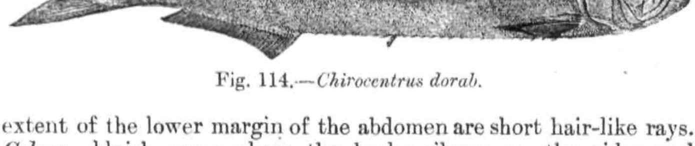

Fig. 114.—*Chirocentrus dorab.*

extent of the lower margin of the abdomen are short hair-like rays. *Colour*—bluish green along the back; silvery on the sides and abdomen.

Hab. Red Sea, through the seas of India to the Malay Archipelago and beyond; attaining at least 12 feet in length. When captured this fish bites at everything near it.

Family VI. CLUPEIDÆ.

Gill-openings usually very wide: pseudobranchiæ, when present, well developed. Abdomen mostly compressed, generally into a sharp edge, and usually serrated. Opercular pieces four. Margin of the upper jaw formed mesially by the premaxillaries, laterally by the maxillaries, which are composed of three pieces not ossified together. Barbels absent. A single dorsal with a few or a moderate number of weak rays; anal sometimes many-rayed. Scales on the body; as a rule none on the head. Lateral line mostly absent. Stomach with a "cul-de-sac." Air-bladder more or less simple. Pyloric appendages, when present, numerous.

The Herrings are well represented in the seas of India, and are largely consumed by the native population. As a rule, they are much more abundant along the Malabar than on the Coromandel coast.

Geographical Distribution. Found in most seas, and many species enter fresh waters.

Synopsis of Indian Genera.

First group. CLUPEINA.

Upper jaw not projecting. Eyes with free adipose lids. Abdomen serrated.

A. Anal moderate, with less than 30 rays.
  Abdominal serration commencing from thorax or pectorals .... 1. CLUPEA.
  Abdominal serration commencing behind pectorals .... 2. CORICA.
B. Anal elongate, with more than 30 rays.
  Dorsal and ventral fins present .... 3. PELLONA.
  Dorsal present, no ventrals .... 4. OPISTHOPTERUS.
  Neither dorsal nor ventrals .... 5. RACONDA.

Second group. CHATOESSINA.

Mouth transverse, narrow, nearly or quite inferior; upper jaw projecting over lower. Eyes with free adipose lids. Abdomen serrated.

Fourth branchial arch with an accessory organ .. 6. CHATOESSUS.

Third group. ENGRAULINA.

Upper jaw prominent. Mouth deep. Eyes covered by skin. Abdomen serrated.

No pectoral filaments .... 7. ENGRAULIS.
Upper pectoral rays produced into free filaments.. 8. COILIA.

Fourth group. DUSSUMIERINA.

Mouth antero-lateral, the upper jaw not projecting. Eyes with free adipose lids. No osseous gular plates. Abdominal edge smooth.

Teeth small, but not deciduous .... 9. DUSSUMIERIA.
Teeth, if present, deciduous.................... 10. SPRATELLOIDES.

Fifth group. ALBULINA.

Mouth inferior and of moderate width; upper jaw projecting. Teeth in jaws. Abdomen rounded and smooth.

Eyes with free adipose lids.................... 11. ALBULA.

Sixth group. ELOPINA.

Mouth antero-lateral; lower jaw the longer. An osseous gular plate. Abdomen rounded and smooth.

Pseudobranchiæ well developed. Scales small .. 12. ELOPS.
Pseudobranchiæ rudimentary or absent. Scales large .... 13. MEGALOPS.

Seventh group. CHANINA.

Mouth anterior, transverse, small. Eyes subcutaneous. Teeth absent. Gill-membranes entirely united. Abdomen rounded and smooth.

Scales small .... 14. CHANOS.

First group. CLUPEINA.

1. Genus **CLUPEA**, sp., Artedi.

Syn. *Clupanodon*, Lacép. (pt.); *Harengula*, *Rogenia*, *Spratella*, *Sardinella*, *Clupeonia*, *Kowala*, *Meletta*, and *Alausa*, Cuv. & Val.; *Clupalosa*, *Amblygaster*, and *Clupeoides*, Bleeker; *Opisthonema*, *Brevoortia*, and *Alausella*, Gill.

Body compressed; the serration of the abdomen extending into the thoracic region; upper jaw not projecting beyond the lower. Eyes usually with broad adipose lids. Teeth, when present, rudimentary and deciduous. Dorsal fin situated opposite the ventrals; anal with less than 30 rays; caudal forked. Pseudobranchiæ well developed. Six branchiostegals in all Indian species.

It is necessary to remember, while investigating species of *Clupea*, that the teeth are deciduous, and the dentition is liable to vary.

Geographical Distribution. World-wide.

Synopsis of Indian Species.

A. Teeth in lower jaw*.
  a. Teeth on tongue, palatines, pterygoids, but none on the vomer.
    D. 19, A. 20–22, L. l. 45 .... 1. *C. brachysoma*, [p. 371.
    D. 18, A. 17–19, L. l. 44–45. Caudal black-tipped........................ 2. *C. atricauda*, p. 372.
    D. 17–18, A. 17–18, L. l. 45............ 3. *C. kunzei*, p. 372.
    D. 17–18, A. 18–20, L. l. 40............ 4. *C. leiogaster*, p. 372.
    D. 16–17, A. 14–16, L. l. 45–48 .... 5. *C. longiceps*, p. 373.
  b. Teeth on tongue and palatines, none on pterygoid or vomer.
    D. 18–19, A. 19–20, L. l. 45–48 .... 6. *C. fimbriata*, p. 373.
  c. Teeth on tongue; none on palatines, pterygoids, or vomer.
    D. 16–17, A. 18–19, L. l. 41–44, L. tr. 11. 7. *C. sindensis*, p. 374.
B. No teeth in the jaws.
  a. Teeth on pterygoids and on the tongue; none on vomer or palatines.
    D. 14–15, A. 17–20, L. l. 38–40 .... 8. *C. lile*, p. 374.
  b. No teeth inside mouth.
    D. 15–18, A. 24–29, L. l. 90. Back transversely barred .... 9. *C. variegata*, p. 375.
    D. 14–16, A. 21–24, L. l. 80–110. Back not barred .... 10. *C. chapra*, p. 375.
    D. 18–19, A. 19–22, L. l. 46–49, L. tr. 17–19. 11. *C. ilisha*, p. 376.
    D. 17, A. 20–21, L. l. 42–45, L. tr. 13–14. Length of head 4¼ in total............ 12. *C. kanagurta*, p. 377.
    D. 16–17, A. 19–20, L. l. 39–40, L. tr. 13–14. Length of head 5 to 5½ in total ...... 13. *C. toli*, p. 377.
    D. 15–16, A. 18–19, L. l. 38–40, L. tr. 10–11. Length of head 5 in total .... 14. *C. melanura*, p. 378.

460. (1.) Clupea brachysoma.

Sardinella brachysoma, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Haring.* p. 19.
Clupea brachysoma, *Day, Fish. India*, p. 635, pl. clxiii, fig. 3 (see synon.).

Currudden toaddy, Mal.

D. 19. P. 17. V. 8. A. 20–22. C. 20. L. l. 45. L. tr. 11–12.

Length of head 5, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter about 3 in length of head, and nearly 1 diam. from end of snout and $\frac{4}{5}$ diam. apart. Lower jaw rather prominent. *Fins*—ventral inserted beneath the centre of the dorsal. Last two anal rays rather prolonged. *Scales*—regularly arranged, their edges crenulated. Scutes well developed, 18 before and 12 behind the base of the ventral fin. *Colour*—greenish above, the bases of the scales being a little dark; caudal fin dark-tipped.

Hab. East coast of Africa, seas of India to the Malay Archipelago; rare in India.

* In some instances these are lost, occasionally they are very minute or even not developed.

461. (2.) Clupea atricauda.

Clupea atricauda, *Günther, Catal.* vii, p. 426; *Day, Fish. India*, p. 636, pl. clxiv, fig. 5 (see synon.).

D. 18. P. 17. V. 8. A. 17–19. C. 20. L. l. 44–45. L. tr. 11.

Length of head $4\frac{3}{4}$, height of body $4\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ to 4 in the length of the head, about 1 diam. from end of snout and $\frac{2}{3}$ diam. apart. Lower jaw projecting beyond the upper. *Fins*—ventral inserted beneath the middle of the dorsal fin. Last two anal rays thickened and slightly elongated. Lower caudal lobe sometimes slightly the longer. *Gill-rakers*—numerous, closely set, and about one third as long as the eye. *Scales*—regularly arranged, with crenulated outer margins: scutes small anteriorly, becoming stronger under the middle of the base of the pectoral fin; 13 behind the base of the ventral. *Colour*—dark steel-blue along the back and upper third of the body, divided by a yellowish line from the silvery sides and abdomen, which are glossed with blue and purple. Caudal with its extremity deep brown or black.

Hab. Andamans to the Malay Archipelago.

462. (3.) Clupea kunzei.

Harengula kunzei, *Bleeker, Batavia Nat. Tijdsch.* xii, p. 209.
Clupea klunzei, *Day, Fish. India*, p. 636, pl. clxiii, fig. 1 (see synon.).

D. 17–18. P. 16. V. 8. A. 17–18. C. 20. L. l. 45. L. tr. 11–12.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of the head, 1 diam. from end of snout and $\frac{2}{3}$ diam. apart. Lower jaw prominent. *Fins*—ventral inserted below the middle of the dorsal fin. Last two anal rays rather thickened and slightly elongated. *Gill-rakers*—fine, about one third as long as the eye, about 38 in the outer branch of lower branchial arch. *Scales*—in regular rows, with the edges roughened. Thirty badly developed scutes, about 13 behind the base of the ventral fin. *Colour*—bluish along the back, becoming silvery white shot with purple on the sides and below.

Hab. Ceylon, Andamans, and Nicobars to the Malay Archipelago.

463. (4.) Clupea leiogaster.

Sardinella leiogaster, *Cuv. & Val. H. N. Poiss.* xx, p. 270.
Clupea leiogaster, *Day, Fish. India*, p. 636 (see synon.).

B. vi. D. 17–18. P. 17. A. 18–20. C. 17. L. l. 40. L. tr. 11–12.

Length of head 5 to $5\frac{1}{4}$, height of body $5\frac{1}{2}$ to 6 in the total length. *Eyes*—diameter $3\frac{1}{3}$ to 4 in the length of the head, 1 diam. from end of snout and $\frac{3}{4}$ to $\frac{4}{5}$ diam. apart. *Fins*—ventral inserted beneath the second fourth of the dorsal. *Scales*—with indistinct transverse

striæ and rough edges: scutes badly developed, about 32 in number. *Colour*—bluish green above, becoming silvery white on the sides and beneath: sometimes a brownish mark on the shoulder. A longitudinal band along the body, with from 13 to 20 intensely blue spots.

Hab. Ceylon, to the Malay Archipelago.

464. (5.) Clupea longiceps.

Sardinella longiceps, *Cuv. & Val. H. N. Poiss.* xx, p. 273.
Clupea longiceps, *Day, Fish. India*, p. 637, pl. clxi, fig. 2 (see synon.).

Lee-gur, Baluch.; *Louar*, Sind; *Mutthi*, Canarese and North Malabar; *Charlay*, South Malabar; "Oil Sardine."

D. 16–17. P. 17. V. 9. A. 14–16. C. 17. L. l. 45–48. L. tr. 13.

Length of head $3\frac{3}{4}$ to 4, height of body 5 to $5\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $1\frac{1}{4}$ diam. apart and 1 to $1\frac{1}{4}$ from end of snout. Lower jaw slightly the longer. *Fins*—dorsal commences nearer to snout than to base of caudal; ventral inserted in a line rather behind the middle of the dorsal. Anal low; its last two rays thickened and rather elongated. *Scales*—indistinctly crenulated and regularly arranged; about 18 badly developed scutes before and 13 or 14 behind the base of the ventral fin. *Gill-rakers*—very numerous, about one half longer than the eye. *Colour*—bluish along the back, with golden reflexions; abdomen silvery shot with purple; sometimes a golden line divides the colour of the back from that of the sides: a large greenish-gold spot on the upper margin of the opercle and preopercle; dorsal greenish; caudal stained with green, the other fins transparent.

Hab. Sind, down the Western coast of India, more rarely on the Eastern, Ceylon, the Andamans to the Malay Archipelago. These fish attain about 8 inches in length, and large quantities of oil are made from them in Malabar; but along the Coromandel coast they never appear to arrive in sufficient quantities, while those that come are rarely fat as in Malabar. Abundant in some years, they occasionally forsake their haunts for several consecutive seasons, returning again in enormous quantities.

465. (6.) Clupea fimbriata.

Spratella fimbriata, *Cuv. & Val. H. N. Poiss.* xx, p. 359, t. 600.
Clupea fimbriata, *Day, Fish. India*, p. 637, pl. clxi, fig. 3 (see synon.).

Kich-uk-louar, Sind; *Cuttay-charlay*, Malabar; *Poonduringa*, Tam.; *Charree-addee*, Hind.; *Kowal*, Tel.

D. 18–19. P. 15. V. 8. A. 19–20. C. 20. L. l. 45–48. L. tr. 11–12.

Length of head 5 to $5\frac{1}{4}$, height of body 4 to $4\frac{3}{4}$ or even 5 in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, nearly 1 diam.

from end of snout and also apart. Lower jaw slightly prominent. *Fins*—ventral inserted under the middle of the dorsal. Last two anal rays thickened and a little prolonged. *Scales*—regularly arranged, with their free edges jagged. Scutes moderately developed, 14 or 15 posterior to the ventral fin, and 16 or 17 before it. *Colour*—bluish green, the sides silvery. Dorsal fin with numerous fine black dots, and a black mark at the base of its anterior rays. Caudal with bluish reflexions and tipped with dark.

Hab. Red Sea, seas of India to the Malay Archipelago. This species abounds in certain years off the Malabar coast.

466. (7.) Clupea sindensis.

Clupea sindensis, *Day, Fish. India*, p. 638, pl. clxiii, fig. 2 (see synon.).

D. 16–17. P. 15. V. 8. A. 18–19. C. 21. L. l. 41–44. L. tr. 11.

Length of head $4\frac{4}{5}$ to 5, height of body $4\frac{1}{2}$ to $4\frac{4}{5}$ in the total length. *Eyes*—diameter $4\frac{1}{4}$ in the length of head, $1\frac{1}{4}$ diam. from end of snout, and 1 apart. Lower jaw prominent. Preorbital with a raised and branched ridge. *Fins*—ventral inserted below the middle of the dorsal. *Scales*—with their edges a little rough (especially in large examples) and having some vertical lines. Scutes not well developed, 13 to 14 behind the base of the ventral fin. *Gill-rakers*—closely set, nearly as long as the eye. *Colour*—back deep blue; sides golden, shot with purple and blue. Fins yellowish, a black spot at base of dorsal anteriorly, and its upper edge dark; the end of the caudal lobes sometimes dark. There are also lines along the rows of scales in the upper two thirds of the body; a small dark shoulder-mark, which is more or less lost in the adult.

Hab. Seas of the Seychelles, Sind and Bombay; attaining at least 8 inches in length.

467. (8.) Clupea lile.

Meletta lile, *Cuv. & Val. H. N. Poiss.* xx, p. 378.
Clupea lile, *Day, Fish. India*, p. 638, pl. clxii, fig. 1 (see synon.).

D. 14–15. P. 13. V. 8. A. 17–20. C. 21. L. l. 38–40. L. tr. 9–10.

Length of head 5 to $5\frac{1}{2}$, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in the length of head, $\frac{2}{3}$ diam. from end of snout and apart. Dorsal profile nearly horizontal, abdominal very convex. Lower jaw slightly the longer. *Fins*—ventral inserted under the anterior dorsal rays. *Gill-rakers*—closely set and half as long as the eye; pseudobranchiæ well developed. *Scales*—rather adherent and in regular rows; their edges smooth. Scutes strong, from 16 to 18 anterior, and 11 to 12 posterior to the base of the ventral fin. Free portion of tail as deep as long. *Colour*—golden shot with purple, a brilliant silvery band along the side, as

deep as one scale. Caudal dark-tipped, shot with blue. A brilliant bronze-coloured spot on occiput.

Hab. Seas of India and Burma, to the Malay Archipelago; attaining to about 4 inches in length. Found in vast numbers along the Western coast of India.

468. (9.) **Clupea variegata.**

Clupea variegata, *Day, P. Z. S.* 1869, p. 623; *Fish. India*, p. 639, pl. clxi, fig. 4.

D. 15–18. P. 17. V. 8. A. 24–29. C. 17. L. l. 90. L. tr. 35.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body 3 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, above 1 apart. Abdominal profile more convex than dorsal. Jaws of about equal length. *Fins*—ventrals situated below the first third of the dorsal fin. *Scales*—regularly arranged behind a line from the opercles to the base of the anal fin, anterior to which they are very irregular. Serrated scales commence under the middle of the pectoral; 10 are posterior to the ventral fin, and about 10 anterior to it. *Colour*—silvery, glossed with gold and bronze. A dark humeral spot. A row of about 18 bars passes across the back and descends a short way over the sides. Dorsal fin with a basal black band in its posterior half. End of tail tipped with black.

Hab. Irrawaddy and its branches. Many specimens procured up to 7 inches in length.

469. (10.) **Clupea chapra.**

Clupanodon chapra, *Ham. Buch. Fish. Ganges*, pp. 248, 383.
Clupea chapra, *Day, Fish. India*, p. 639, pl. clxi, fig. 1 (see synon.).

Coori, Bengali; *Gudua*, Ooriah.

D. 14–16. P. 13. V. 8. A. 21–24. C. 17. L. l. 80–110. L. tr. 33–35.

Length of head $4\frac{1}{3}$ to $4\frac{1}{2}$ (4 in the young), height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in the length of head, $\frac{2}{3}$ diam. from end of snout, and 1 to $1\frac{1}{4}$ apart. Abdominal profile more convex than dorsal. *Fins*—origin of dorsal opposite or slightly before that of the ventral; anal highest in front. *Gill-rakers*—closely set, very numerous and rather shorter than the eye. *Scales*—smooth; 18 to 19 scutes anterior and 9 to 10 posterior to the ventral fin. *Colour* silvery, shot with gold; back rather dark, and edge of caudal stained darkest; a dark spot, which is sometimes absent, on the shoulder.

Hab. Fresh waters of rivers and tanks in Sind and throughout India as far south as the Kistna River; absent from the Malabar coast and Madras. This fish attains to at least 8 inches in length.

470. (11.) **Clupea ilisha.** (Fig. 115.)

Clupanodon ilisha, *Ham. Buch. Fish. Ganges*, pp. 243, 382, pl. 19, fig. 73.

Clupea ilisha, *Day, Fish. India*, p. 640, pl. clxii, fig. 3.

"Sable fish" and "Hilsa" of Europeans; *Palasah*, Tel.; *Pulla*, Sind; *Oolum*, Tamil; *Nga-tha-louk*, Burmese; *Hilsa*, Beng.; *Ilisha*, Ooriah.

D. 18–19. P. 15. V. 9. A. 19–22. C. 19. L. l. 46–49. L. tr. 17–19.

Length of head $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the total length. *Eyes*—situated some distance before the middle of the length of the head, 1 to $1\frac{1}{2}$ diam. from end of snout, and $1\frac{1}{2}$ apart. The posterior extremity of the maxilla reaches to below the middle or even

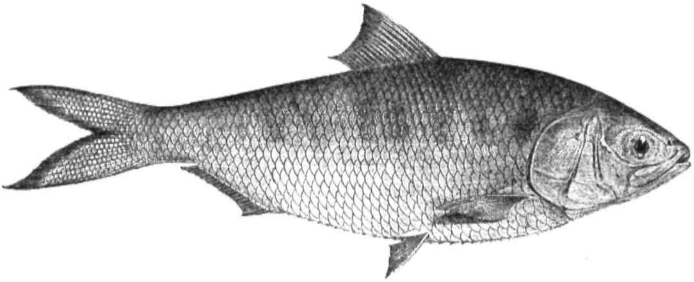

Fig. 115.—*Clupea ilisha.*

hind edge of the orbit; lower jaw not projecting beyond the upper. Width of opercle equals about two thirds its height. *Fins*—ventral inserted beneath the anterior half of the dorsal. Caudal peduncle as deep as long. *Gill-rakers*—numerous and as long as the eye. *Scales*—in regular rows; 16 to 17 scutes before and 14 to 15 behind the insertion of the ventral fin. *Colour*—silvery, shot with gold and purple; no spots in the adult, but a row of them along the upper third of the body in the immature, the most distinct of which is behind the upper third of the opercle.

C. ilisha swarms up all the larger rivers of India and Burma, generally as soon as the monsoon commences; but the rapidity of the current affects the time of migration. Amongst such rivers as I have examined, the following appear to be the periods when these fish commonly ascend. In the Cauvery and Coleroon they appear about the first or second week of June, and continue for the succeeding four months, but in smaller quantities. In the Kistna, which is very rapid, a few fish arrive at the end of September, when the strength of the current is subsiding; but it is in the middle of October and in the two following months that the main body ascends. In the neighbouring river, the Godávari, which has a less rapid current, the fish ascend earlier, being most numerous from July to September. In the Hooghly they continue their ascent throughout the south-west monsoon to nearly the end of the year.

In the Indus they ascend in March and April, when the river is swollen by the melting of Himalayan snow. They have been observed in the Irrawaddy in Burma as high as Mandalay, in October. They are excellent as food until they have deposited their ova, when they become thin and unwholesome. Weirs in India are destitute of fish-passes, and migratory fishes will probably soon be exterminated in rivers spanned by these obstacles.

Hab. Persian Gulf (ascending the Tigris), the coasts of Sind, India, and Burma, passing up the large rivers to breed; also the Malay Archipelago. I have taken this fish as high as Delhi, and Hamilton Buchanan records it from Agra and Cawnpore.

471. (12.) **Clupea kanagurta.**

Alosa kanagurta, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Haring.* p. 34.
Clupea kanagurta, *Day, Fish. India,* p. 640, pl. clxii, fig. 4 (see synon.).

Keelee, Tel.

D. 17. P. 16. V. 8. A. 20–21. C. 19. L. l. 42–45. L. tr. 13–14.

Length of body $4\frac{1}{4}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and about 1 apart. Abdominal profile more convex than that of the back. Width of opercle about $\frac{1}{2}$ its height. Lower jaw scarcely projects beyond the upper. The maxilla extends posteriorly to below the hinder third of the orbit. *Fins*—ventral situated rather behind the middle of the dorsal. *Scales*—regularly arranged: scutes 27; 11 behind the base of the ventral fin. *Colour*—bluish green above, gold dotted with purple on the sides and beneath. Generally a row of about six or eight oval spots pass in a line from behind the upper edge of the opercle along the side. Upper edge of dorsal with a dark mark.

Hab. East coast of Africa; Sind, coasts of India to the Malay Archipelago.

472. (13.) **Clupea toli.**

Alausa toli, *Cuv. & Val. H. N. Poiss.* xx, p. 435.
Clupea toli, *Day, Fish. India,* p. 641, pl. clxii, fig. 2 (see synon.).

Oolum, Tamil; *Doung danna,* Arracan; *Nur hilisha,* Chittagong.

D. 16–17. P. 14. V. 9. A. 19–20. C. 24. L. l. 39–40. L. tr. 13–14.

Length of head 5 to $5\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{4}$ in length of head, 1 diam. from end of snout and also apart. Lower jaw rather projecting beyond the upper, which latter is notched at its extremity. Width of opercle $\frac{1}{2}$ to $\frac{2}{3}$ its height. *Fins*—ventral inserted under the commencement of the last half of the dorsal fin. Caudal lobes longer than the head, especially in adult examples. *Scales*—regularly arranged, striated, and with crenulated edges. Scutes well developed, 17 to 18 before,

and 12 to 13 behind the base of the ventral fin. Pseudobranchiæ well developed. *Colour*—silvery, shot with yellow and purple; a dark shoulder-spot in the young.

Hab. From Bombay through the seas of India to the Malay Archipelago and China. This species attains at least 3 feet in length. It does not appear to ascend rivers to breed, but is sometimes found at their mouths.

473. (14.) Clupea melanura.

Alausa melanura, *Cuv. & Val. H. N. Poiss.* xx, p. 441.
Clupea melanura, *Day, Fish. India*, p. 641 (see synon.).

D. 15–16. P. 13. V. 8. A. 18–19. C. 19. L. l. 38–40. L. tr. 10–11.

Length of head 5, height of body 4 to 5 in the total length. *Eyes*—with very narrow adipose lids, diameter 3 to $3\frac{1}{2}$ in length of head, 1 diam. from end of snout, $\frac{3}{4}$ apart. Lower jaw rather longer than the upper. *Fins*—dorsal commences opposite to or slightly in front of ventral. *Scales*—in regular horizontal rows, with two or three raised lines along their base, 25 serrated scales along the abdominal edge. *Colour*—back blue shot with purple, a fine yellow line dividing it from the silvery sides and abdomen; a blue spot on the opercle; outer third of caudal lobes black.

Hab. Seas of India and the Malay Archipelago.

2. Genus CORICA, Hamilton Buchanan.

Syn. *Clupeoides* and *Clupeichthys*, Bleeker.

Body oblong, compressed. Lower jaw the longer. Teeth, when present, rudimentary and deciduous. Anal fin of moderate extent. Caudal forked. Scales of medium size. Abdomen serrated; serration usually commencing behind the pectoral fins.

Geographical Distribution. India to the Malay Archipelago.

474. (1.) Corica soborna. (Fig. 116.)

Corica soborna, *Ham. Buch. Fish. Gang.* pp. 253, 383; *Day, Fish. India*, p. 642, pl. clxii, fig. 5 (see synon.).

Cutwaal Alise and *God-haee*, Ooriah.

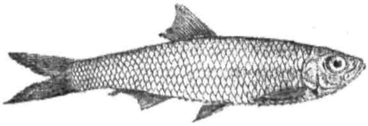

Fig. 116.—*Corica soborna.*

B. vi. D. 15–16. A. 14–15+ii. C. 19. L. l. 40–42. L. tr. 10.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total

length. *Eyes*—diameter $\frac{2}{5}$ of length of head. Body strongly compressed. *Fins*—dorsal arises rather nearer to base of caudal than to snout, and rather behind the origin of the ventrals; the anal has its last two rays detached. Lower lobe of caudal the longer. *Scales*—anterior to the ventral fin there are 10 or 11 serrated scales, and 7 or 8 posterior to it. *Colour*—silvery, with a light band.

Hab. Orissa and Bengal. Rarely attaining above 2 inches in length.

3. Genus **PELLONA**, Cuvier & Valenciennes.

Syn. *Ilisha*, Gray; *Platygaster*, Swainson.

Branchiostegals six. Body strongly compressed, the thoracic and abdominal edges serrated. Mouth of moderate size. Upper jaw generally emarginate, and shorter than the lower. Fine sharp teeth in the jaws, palatines, and pterygoid bones, also on the tongue, but none on the vomer. Dorsal fin small, median. Ventrals small, inserted more in front than the dorsal; anal elongate. Scales large or of moderate size, rarely small.

Owing to individual variation, species of this genus are difficult to distinguish.

Geographical Distribution. Tropical parts of the Atlantic and Indian Oceans, and some Indian rivers.

Synopsis of Indian Species.

A. Dorsal fin almost or entirely in advance of the anal.	
a. Occipital ridges subparallel behind.	
L. tr. 15–16. Height of body $3\frac{3}{4}$ to 4 in total	1. *P. filigera*, p. 380.
L. tr. 16. Height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in total	2. *P. elongata*, p. 380.
L. tr. 12–13. Head 5, height of body 4 to $4\frac{1}{4}$ in total	3. *P. motius*, p. 381.
L. tr. 13–14. Head $4\frac{1}{3}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in total	4. *P. indica*, p. 381.
b. Occipital ridges converging behind.	
L. tr. 14. Head $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in total. Scutes 23 before ventrals	5. *P. ditchela*, p. 381.
Scutes 13 before ventrals	6. *P. hoevenii*, p. 382.
B. Dorsal fin situated entirely or partially over the anal.	
L. l. 43–44, L. tr. 14–15	7. *P. brachysoma*, p. 382.
L. l. 48–50, L. tr. 14–15	8. *P. megaloptera*, p. 382.
L. l. 48, L. tr. 10	9. *P. sladeni*, p. 383.
L. l. 70	10. *P. leschenaultii*, p. 383.

475. (1.) Pellona filigera.

Pellona filigera, *Cuv. & Val. H. N. Poiss.* xx, p. 322; *Day, Fish. India*, p. 643, pl. clxv, fig. 4 (see synon.).

D. 18–19. P. 17. V. 8. A. 46–50. C. 19. L. l. 50. L. tr. 15–16.

Length of head $5\frac{1}{4}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{1}{3}$ apart. Abdominal profile much more convex than that of the back. The posterior portions of the ridges on the occiput are parallel. *Fins*—ventral fins very short. Length of base of anal fin $2\frac{2}{3}$ in total length excluding caudal. Caudal lobes elongated. Scutes well developed, 22 to 23 before, and 10 or 12 posterior to base of ventral fin. *Colour*—a coppery tinge along the back; sides silvery, with mother-of-pearl reflexions. Dorsal and pectoral fins black-tipped.

Hab. Bombay; growing to 1 foot in length.

476. (2.) Pellona elongata. (Fig. 117.)

Alosa elongata, *Bennett, Life of Sir S. Raffles*, p. 691.
Pellona elongata, *Day, Fish. India*, p. 643, pl. clxiv, fig. 3, and pl. clxv, fig. 1 (see synon.).

Nga thyngyé and *Khebowk thyn*, Arracan; *Ram Gashu*, Chittagong; *Nga pya*, Burmese.

D. 15–17. P. 15. V. 7. A. 40–49. C. 17. L. l. 46–56. L. tr. 14–16.

Length of head $4\frac{3}{4}$ to $5\frac{1}{4}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to 4 in length of head, 1 diam. from end of snout, and $\frac{1}{2}$ apart. Abdominal profile more convex than that of the back. The posterior halves of the ridges on the occiput

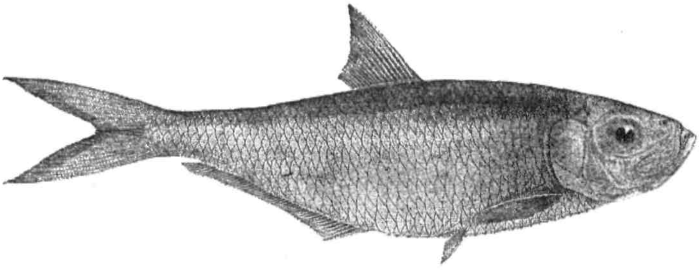

Fig. 117.—*Pellona elongata.*

are nearly parallel. Ventral minute. Length of base of anal 3 to $3\frac{1}{4}$ in total length excluding caudal. *Scales*—abdominal scutes well developed, 20 to 24 anterior, and 8 or 10 posterior to the base of the ventral fin. *Colour*—silvery, shot with mother-of-pearl. Fins yellowish, edge of dorsal black-tipped.

Hab. Seas of India, to the Malay Archipelago, China, and Japan.

477. (3.) Pellona motius.

Clupanodon motius, *Ham. Buch. Fish. Ganges*, pp. 251, 383.
Pellona motius, *Day, Fish. India*, p. 643, pl. clxv, fig. 3 (see synon.).
Ursi or *Alise*, Ooriah.

D. 16–17. P. 15. V. 7. A. 40–41. L. l. 43–45. L. tr. 12–13.

Length of head 5, height of body 4 to $4\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{1}{2}$ apart. Abdominal profile more convex than that of the back. The posterior halves of the ridges on the summit of the head are nearly parallel. *Teeth*—on jaws, tongue, and palate. *Fins*—length of base of anal $\frac{1}{3}$ of total excluding caudal; ventral fin nearly as long as the eye. *Scales*—7 or 8 scutes posterior to base of ventral, and 15 or 16 anterior to it. *Colour*—silvery, with mother-of-pearl reflexions; a burnished lateral band. Some fine dots on the fins and along the edges of some of the scales. Caudal fin with a dark outer edge; a dark band along the middle of the dorsal.

Hab. Assam, Bengal, and Orissa, descending as low as the coast. This fish does not appear to exceed about 4 inches in length.

478. (4.) Pellona indica.

Platygaster indicus, *Swainson, Lardner's Cab. Cycl., Fishes, &c.* ii. p. 294.
Pellona indica, *Day, Fish. India*, p. 644, pl. clxiv, fig. 4 (see synon.).
Poo-na-no-dah, Andamanese; *Ditchoee*, Tel.

D. 17. P. 16. V. 7. A. 39–40. C. 17. L. l. 44. L. tr. 13–14.

Length of head $4\frac{1}{3}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ to 3 in length of head, $\frac{2}{3}$ diam. from end of snout, and $\frac{1}{2}$ apart. Abdominal profile more convex than dorsal. The posterior halves of the ridges on the occiput are parallel. *Teeth*—in the jaws, tongue, palatine, and pterygoid bones. *Fins*—length of base of anal $2\frac{3}{4}$ to 3 in total excluding caudal. Ventral small, shorter than the eye. *Scales*—with the edges rather roughened; 25 or 26 scutes, 18 between the throat and base of ventral fin. *Colour*—greenish along the back, becoming silvery shot with purple and gold on the sides and below; dorsal fin often tipped black.

Hab. East coast of Africa; seas of India to the Malay Archipelago.

479. (5.) Pellona ditchela.

Pellona ditchela, *Cuv. & Val. H. N. Poiss.* xx, p. 314; *Day, Fish. India*, p. 644, pl. clxv, fig. 5 (see synon.).
Ditchellee, Tel.

D. 18. P. 16. V. 6. A. 36–40. C. 19. L. l. 40–44. L. tr. 14.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*

—diameter about $\frac{1}{3}$ of length of head, nearly 1 diam. from end of snout, and $\frac{1}{2}$ apart. Abdominal profile rather more convex than dorsal. The posterior halves of the ridges on the occiput converge. *Teeth*—in jaws, tongue, and palate. *Fins*—ventral nearly as long as the eye. Length of base of anal $3\frac{1}{2}$ in total excluding caudal. *Scales*—scutes well developed, 23 anterior and 10 posterior to base of ventral fin. *Colour*—silvery, with a burnished lateral band, the upper edge of the dorsal fin rather dark.

Hab. Coromandel coast of India.

480. (6.) **Pellona hoevenii.**

Pellona hoevenii, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Haring.* p. 21; *Day, Fish. India*, p. 644, pl. clxv, fig. 6 (see synon.).

D. 18. P. 17. V. 7. A. 36. L. l. 43. L. tr. 13.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{2}{3}$ to 3 in the length of the head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Abdominal profile rather more convex than dorsal. The posterior halves of the ridges on the occiput meet posteriorly. *Teeth*—on the jaws, tongue, palatine, and pterygoid bones; also along a small accessory bone between the premaxillaries and the superior maxillary. *Fins*—length of base of anal $3\frac{1}{3}$ in total excluding caudal. Ventral small, shorter than the eye. *Scales*—with the edges almost smooth; 22 scutes, 13 anterior to base of ventral. *Colour*—greenish along the back, becoming silvery with mother-of-pearl reflexions on the sides and beneath.

Hab. Coromandel coast of India (where this fish abounds) to the Malay Archipelago.

481. (7.) **Pellona brachysoma.**

Pellona brachysoma, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Haring.* p. 22; *Day, Fish. India*, p. 645, pl. clxiv, fig. 2 (see synon.).

Paunia puiee, Ooriah.

D. 16–17. P. 16. V. 7. A. 46–51. C. 17. L. l. 43–44. L. tr. 14–15.

Length of head $4\frac{1}{2}$ to $4\frac{2}{5}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in the length of head, $\frac{3}{4}$ diam. from end of snout, and $\frac{1}{2}$ apart. Abdominal profile more convex than dorsal. The posterior halves of the ridges on the occiput are nearly parallel. *Fins*—last few dorsal rays extend over anal. Ventral small. Length of base of anal $2\frac{1}{2}$ to $2\frac{2}{3}$ in total excluding caudal. *Scales*—18 scutes anterior to ventral fin, and 8 posterior to it. *Colour*—golden glossed with purple.

Hab. Seas of India to the Malay Archipelago.

482. (8.) **Pellona megaloptera.**

Platygaster megalopterus, *Swainson, Lardner's Cab. Cycl., Fishes, &c.* ii. p. 294.

Pellona megaloptera, *Day, Fish. India,* p. 645, pl. clxv, fig. 2 (see synon.).

Jangarloo, Tel.

D. 17–18. P. 17. V. 7. A. 43–50. C. 17. L. l. 48–50. L. tr. 14–15.

Length of head $4\frac{1}{4}$ to $4\frac{2}{3}$, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—diameter $2\frac{2}{3}$ to 3 in the length of the head, $\frac{3}{4}$ diam. from end of snout, and $\frac{1}{4}$ apart. Abdominal profile slightly more convex than dorsal. The posterior halves of the occipital ridges are parallel. *Fins*—last few dorsal rays are above the commencement of the anal. Pectoral reaches to above the ventral, which last is not half so long as the eye, and is sometimes entirely absent. Length of base of anal nearly $\frac{1}{3}$ of total excluding caudal. *Scales*—22 scutes anterior, and 8 posterior to the ventral fin.

Hab. Seas of India to the Malay Archipelago.

483. (9.) **Pellona sladeni.**

Pellona sladeni, *Day, P. Z. S.* 1869, p. 623; *Fish. India,* p. 645, pl. clxiv, fig. 1.

D. 13. P. 11. V. 7. A. 44. C. 21. L. l. 48. L. tr. 10.

Length of head 5, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout. Ridges on the occiput slightly diverge behind. *Fins*—first two dorsal rays in advance of anal, the remainder of the former fin over the latter. Pectoral reaches to nearly the end of the ventral, which is small. 23 spiny scales on the abdominal profile anterior to the ventral fins, and 10 posterior to them. *Colour*—silvery, opercles golden; caudal edged with black.

Hab. Irrawaddy, as high as Mandalay.

484. (10.) **Pellona leschenaultii.**

Pellona leschenaultii, *Cuv. & Val. H. N. Poiss.* xx, p. 311; *Day, Fish. India,* p. 646 (see synon.).

D. 21. P. 17. V. 8. A. 42. C. 27. L. l. 70.

Height of body nearly 4 in the total length. *Teeth*—very distinct in premaxillaries and mandibles. *Fins*—pectoral large and rounded towards its extremity, and extending beyond the insertion of the ventrals, which are small, and arise about eight or nine rows of scales nearer the head than the origin of the dorsal. Anal elongated. *Colour* silvery.

Hab. A single dried example (20 inches long) was brought from Pondicherry.

4. Genus **OPISTHOPTERUS**, Gill.

Syn. *Pristigaster,* sp., Cuv.

Branchiostegals six. Body oblong, compressed. The lower jaw

projecting. Small sharp teeth in the jaws, palatines, pterygoids, and tongue; none on the vomer. Dorsal fin situated above the anal, which has many rays; ventrals absent. Scales of moderate or small size, very deciduous. Abdominal serration well developed.

This genus is closely allied to the last, the chief difference being absence of ventral fins. Occasionally examples of *Pellona* are seen in which these fins are deficient.

485. (1.) **Opisthopterus tartoor.** (Fig. 118.)

Pristigaster tartoor, *Cuv. & Val. H. N. Poiss.* xx, p. 328.
Opisthopterus tartoor, *Day, Fish. India,* p. 646, pl. clxiii, fig. 5 (see synon.).

D. 15–17. P. 14. A. 56–63. C. 17. L. l. 50. L. tr. 12.

Length of head $5\frac{1}{2}$ to $5\frac{3}{4}$, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—diameter $2\frac{3}{4}$ to 3 in length of head. *Fins*—the pectoral, somewhat longer than the head, reaches to over the first anal ray; caudal forked. *Scales*—28 to 32 spines along the lower

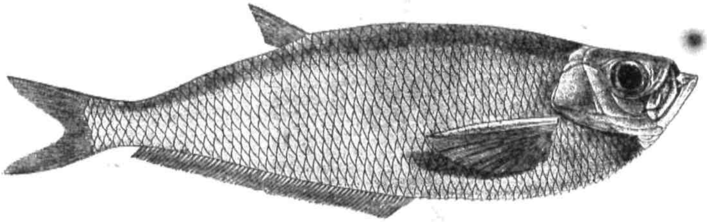

Fig. 118.—*Opisthopterus tartoor.*

profile. Gill-rakers about 28, and nearly as long as the eye. Pseudobranchiæ well developed. *Colour*—silvery.

Hab. From Gwadur in Baluchistan and Sind, through the seas of India to the Malay Archipelago; attaining at least 9 inches in length.

5. Genus **RACONDA**, Gray.

Syn. *Apterygia*, Gray.

This genus differs from the last in having no dorsal fin. The only species is more abundant along the coast of India than in the Malay Archipelago.

486. (1.) **Raconda russelliana.** (Fig. 119.)

Raconda russeliana, *Gray, Zool. Misc.* p. 9; *Day, Fish. India,* p. 646, pl. clxiii, fig. 4 (see synon.).

Nga thendoong, Burmese.

P. 13. A. 92. C. 19. L. l. 64. L. tr. 12.

Length of head $6\frac{1}{2}$ to 7, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of head. The end of lower jaw forms a portion of the dorsal profile, which is concave above the orbit, whilst the anterior portion of the abdominal profile is very convex. *Fins*—upper pectoral ray enlarged; caudal deeply forked, the lower lobe the longer. *Scales*—from 31 to 38

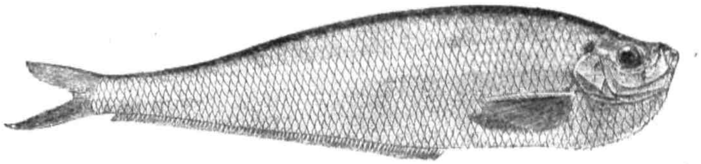

Fig. 119.—*Raconda russelliana.*

weak scutes along the abdominal edge. Pseudobranchiæ well developed. *Colour*—a narrow dark bluish band along the back, succeeded by a light bronze line, which is divided by a lighter and wider band from a broad silvery one passing from the head to the caudal fin. A deep brown or black spot on the shoulder. The young are purple with a silvery band along the side.

Hab. Bay of Bengal to the Malay Archipelago. The young are common in the Sundarbans.

Second group. CHATOESSINA.

6. Genus **CHATOESSUS**, Cuvier & Valenciennes.

Syn. *Dorosoma*, Rafinesque; *Gonostoma*, v. Hasselt; *Anodontostoma*, Bleeker.

Branchiostegals from four to six (six in Indian species). Body oval, short, deep, and moderately compressed; with a sharp, serrated abdominal edge. Snout overhanging a rather narrow transverse mouth. Teeth absent from jaws. Anal fin commencing behind the dorsal; caudal forked. Air-bladder large, rounded anteriorly, pointed posteriorly. Cæcal pylori numerous. Pseudobranchiæ well developed.

Geographical Distribution. Coasts and rivers of India, Burma, Malayasia, and North and Central America.

Synopsis of Indian Species.

A. Last dorsal ray not prolonged.
- L. l. 40–42, L. tr. 13–14 . . . . 1. *C. chacunda*, p. 386.
- L. l. 47, L. tr. 17 . . . . 2. *C. modestus*, p. 386.
- L. l. 58–63, L. tr. 22–24 . . . . 3. *C. manminna*, p. 386.

B. Last dorsal ray prolonged . . . . 4. *C. nasus*, p. 387.

Third group. ENGRAULINA.

7. Genus **ENGRAULIS**, Cuvier.

Syn. *Stolephorus*, Lacépède; *Thryssa* and *Telara*, Cuvier; *Setipinna*, Swainson; *Pterengraulis*, *Lycengraulis*, *Lycothrissa*, and *Heterothrissa*, Günther.

Branchiostegals short and rather numerous. Gill-openings wide, the membrane connecting the two sides short, thus leaving the isthmus uncovered. Body oblong or elongated, compressed, and serrated along the abdominal edge. Cleft of mouth deep, oblique; snout conical; the upper jaw generally the longer; maxillaries of varying length, but always long, having a membranous attachment to the cheeks. Teeth small, sometimes of unequal size, usually present on the jaws, vomer, palatine and pterygoid bones. Scales large or of moderate size.

Geographical Distribution. Temperate and tropical seas and rivers.

Synopsis of Indian Species.

a. Dorsal fin in advance of anal.
- A. 40–41, L. l. 44, L. tr. 11–12. Snout slightly projecting. Maxilla nearly reaches base of pectoral fin .... 1. *E. hamiltonii*, p. 389.
- A. 40–43, L. l. 39–40, L. tr. 11–12. Height of body $3\frac{3}{4}$ in total. Maxilla reaches gill-opening .... 2. *E. malabaricus*, p. 389.
- A. 35–38, L. l. 45, L. tr. 12. Maxilla reaches base of pectoral fin .... 3. *E. mystax*, p. 390.
- A. 34–38, L. l. 36–38, L. tr. 9–10. Maxilla reaches gill-opening .... 4. *E. kammalensis*, p. 390.
- A. 29–32, L. l. 41, L. tr. 8 .... 5. *E. bœlama*, p. 391.
- A. 34–38, L. l. 36–44, L. tr. 11. Maxilla reaches end of ventral fin .... 6. *E. setirostris*, p. 391.
- A. 34–36, L. l. 40–42, L. tr. 9–10. Maxilla reaches to origin of ventral fin .... 7. *E. dussumieri*, p. 391.

Dorsal fin partly or entirely above anal.

a'. Upper pectoral ray elongate.
- A. 70–80, L. l. 52, L. tr. 14. Snout slightly projecting .... 8. *E. telara*, p. 392.
- A. 60–64, L. l. 54–56, L. tr. 14. Lower jaw slightly prominent .... 9. *E. breviceps*, p. 392.
- A. 51–57, L. l. 42–46, L. tr. 12. Snout slightly projecting .... 10. *E. taty*, p. 393.

b'. Upper pectoral ray not elongate; a broad silvery lateral band.
- A. 45–47 .... 11. *E. purava*, p. 393.
- P. 15–16, A. 19–21. Maxilla reaches gill-opening .... 12. *E. commersonianus*, [p. 394.
- A. 19. Maxilla enlarged and truncated opposite mandibular joint .... 13. *E. indicus*, p. 394.
- P. 13. A. 20–22. Maxilla reaches gill-opening .... 14. *E. tri*, p. 395.

491. (1.) Engraulis hamiltonii.

Thryssa hamiltonii, *Gray & Hardw. Ill. Ind. Zool.* ii, pl. 92, fig. 3.
Engraulis hamiltonii, *Day, Fish. India*, p. 625, pl. clvii, fig. 4 (see synon.).

Poorawah, Tel.

B. xii. D. 1 + 13. P. 12. V. 7. A. 40–41. C. 19. L. l. 44. L. tr. 11–12.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—$4\frac{1}{4}$ diameters in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. Snout slightly in advance of the end of the lower jaw; the maxilla nearly reaches the base of the pectoral fin. *Fins*—pectoral reaches to above the middle of the small ventral. Anal commences behind the vertical from the last dorsal ray. *Scales*—scutes strong, 16 anterior to the ventral, and 10 posterior. Pseudobranchiæ rudimentary. *Colour*—bronze along the back, divided in the fresh state by a silvery band from the purple-and-gold tinted abdomen. Black venules on the shoulder behind the upper half of the opercle. Fins yellow, dorsal sometimes edged with black.

Hab. Sind, through seas of India to the Malay Archipelago.

492. (2.) Engraulis malabaricus. (Fig. 121.)

Clupea malabarica, *Bloch, Ich.* pl. 432.
Engraulis malabaricus, *Day, Fish. India*, p. 625, pl. clvii, fig. 5 (see synon.).

Monangoo, Mal.; *Poor-relan*, Tam.; *Poorwa*, Tel.

B. xii. D. 1 + 14–15. P. 14. A. 40–43. C. 20. L. l. 39–40. L. tr. 11–12.

Length of head 5, height of body $3\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{2}$

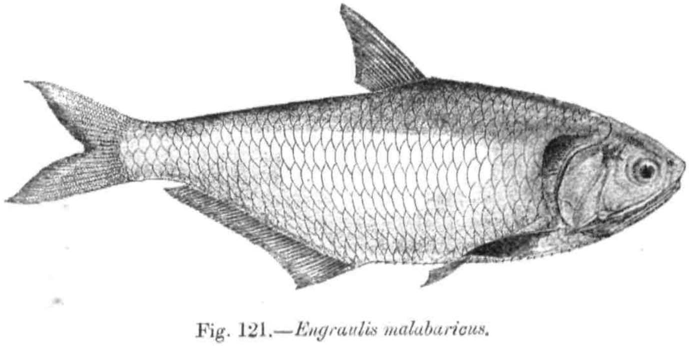

Fig. 121.—*Engraulis malabaricus.*

apart. Snout slightly in advance of the lower jaw. Maxilla expands posteriorly to the gill-opening. *Fins*—anal commences behind the vertical from the last dorsal ray. Pectoral reaches the

base of the ventral. *Scales*—regularly arranged; 17 scutes before and 9 or 10 behind the base of the ventral fin. Pseudobranchiæ rudimentary. *Colour*—silvery shot with gold and purple; black venules on the shoulders. Fins yellow; dorsal and end of caudal edged with dark; pectoral sometimes, but not usually, black.

Hab. Coasts of Sind and through the seas of India.

493. (3.) **Engraulis mystax.**

Clupea mystax, *Bl. Schn. Syst. Ich.* p. 426, t. 83.
Engraulis mystax, *Day, Fish. India*, p. 625, pl. clvii, fig. 3 (see synon.).

Ram pyshia, Chittagong.

B. xii–xiv. D. 1+13–15. P. 12. V. 7. A. 35–38. C. 19. L.l. 45. L.tr. 12.

Length of head 5, height of body $4\frac{1}{2}$ to $4\frac{3}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{3}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. The maxilla extends backwards to opposite the base of the pectoral fin. *Fins*—anal commences just posterior to the last dorsal ray; pectoral extends to the last third of the small ventral. *Scales*—9 strong scutes behind the ventral fin and 16 or 17 weaker before it. Pseudobranchiæ rudimentary. *Colour*—black venules over the scapular region; the dorsal and caudal yellow, the latter having a black upper and posterior end, at least in the young.

Hab. Seas and estuaries of India to the Malay Archipelago and China.

494. (4.) **Engraulis kammalensis.**

Engraulis kammalensis, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Madura*, p. 13; *Day, Fish. India*, p. 626, pl. clvii, fig. 1 (see synon.).

B. x.–xi. D. 1+13–14. P. 12. A. 34–38. C. 19. L.l. 36–38. L.tr. 9–10.

Length of head $4\frac{1}{2}$, height of body 4 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout and also apart. Maxilla extending backwards to opposite the gill-opening. *Fins*—pectoral reaches to base of small ventral, which is inserted rather in advance of dorsal; anal commences a short distance behind the last dorsal ray. *Scales*—14 scutes before and 8 behind the base of the ventral fin. Pseudobranchiæ rudimentary. *Colour*—silvery, tinged with gold; the upper portion of the head, dorsal, and caudal fins yellowish, with numerous fine black dots. Dark venules on the shoulder, extending indistinctly over the back.

Hab. Ceylon, Bay of Bengal to the Malay Archipelago; attaining about 6 inches in length.

495. (5.) Engraulis bælama.

Clupea bælama, *Forsk. Descr. Anim.* p. 72.
Engraulis boelama, *Day, Fish. India*, p. 626, pl. clviii, fig. 7 (see synon.).

B. xi. D. 14–16. P. 13. V. 7. A. 29–32. C. 20. L. l. 41. L. tr. 8.

Length of head $4\frac{1}{2}$, height of body 5 in the total length. *Eyes*—diameter 4 in length of head, nearly 1 diam. from end of snout, and 1 apart. Snout pointed, and projecting considerably beyond the end of the jaws. Maxilla reaching slightly beyond the mandibular joint. *Fins*—anal commences a short distance behind the last dorsal ray. Pectoral nearly reaches the ventral, which is inserted below the anterior dorsal rays. *Scales*—regularly arranged; scutes very indistinct, not extending above halfway between base of the pectoral and ventral fins, 4 or 5 being before and 8 or 9 behind the base of the latter. *Colour*—bluish above, becoming silvery on the sides and beneath; head glossed with gold.

Hab. From the Red Sea and coast of Zanzibar, through the seas of India to the Andamans; also recorded by Günther from Mysol and Manado.

496. (6.) Engraulis setirostris.

Clupea setirostris, *Broussonet, Ich.* dec. i. tab.
Engraulis setirostris, *Day, Fish. India*, p. 626 (see synon.).

Yeka-poorawah, Tel.

B. x–xi. D. 1 + 14–16. P. 14. V. 6. A. 34–38. C. 17. L. l. 36–44. L. tr. 11.

Length of head $5\frac{3}{4}$ to $6\frac{1}{2}$, height of body $4\frac{1}{4}$ to 5 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{1}{2}$ diam. from end of snout, and 1 apart. Snout hardly projecting. The maxillary very prolonged, extending to the posterior end of the ventral fin or even beyond. *Fins*—the anal commences just posterior to the last dorsal ray. Abdominal edge spiny; 17 spines before and 9 behind the insertion of the ventral fin. *Colour*—greenish along the back, becoming silvery on the sides and beneath. Black venules in the region of the scapula.

Hab. From the Red Sea through the seas of India to the Malay Archipelago.

497. (7.) Engraulis dussumieri.

Engraulis dussumieri, *Cuv. & Val. H. N. Poiss.* xxi, p. 69; *Day, Fish. India*, p. 627, pl. clviii, fig. 4 (see synon.).

B. xii. D. 1 + 13–15. P. 12. V. 7. A. 34–36. C. 17. L. l. 40–42. L. tr. 9–10.

Length of head $4\frac{1}{2}$ to $4\frac{2}{3}$, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $\frac{2}{3}$ diam. from end of snout, and 1 apart. The snout projects considerably over the

mouth. The maxilla elongated posteriorly and almost or quite reaching the ventral fin. *Fins*—dorsal situated entirely in advance of anal. Pectoral as long as head without the snout. Ventral inserted slightly in advance of the vertical from the origin of the dorsal. Lower caudal lobe the longer. 7 or 8 strong spines behind the ventral fin, and 13 or 14 anterior to it. Pseudobranchiæ rudimentary. *Colour*—coppery, becoming silvery below, a large black shoulder-spot passing over the back. Caudal straw-coloured, with a dark extremity.

Hab. Seas of India to the Malay Archipelago.

498. (8.) Engraulis telara.

Clupea telara, *Ham. Buch. Fish. Ganges*, pp. 241, 382, pl. ii, fig. 72.
Engraulis telara, *Day, Fish. India*, p. 627, pl. clviii, fig. 2 (see synon.).

Tampara, Ooriah; *Nga pyá*, *Nga tannét*, and *Nga out pha*, Burmese.

B. xii–xiii. D. 1 + 14–15. P. 15. V. 7. A. 70–80. C. 19. L. l. 52. L. tr. 14.

Length of head 6 to 7, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. The maxilla extends to opposite the gill-opening. *Fins*—origin of dorsal slightly posterior to that of anal, much nearer to snout than to base of caudal fin. Pectoral with its upper ray elongated to opposite the centre of anal fin (in some examples this ray is only slightly produced), whilst the fin itself extends to opposite the posterior end of the ventral; lower caudal lobe the longer, the upper truncated; base of the anal fin considerably more than half the total length without the caudal fin. *Scales*—7 spiny scales behind the ventral and 15 or 16 before it. Pseudobranchiæ rudimentary. *Colour*—greenish along back, becoming silvery dashed with gold along the abdomen; dorsal and caudal yellow, the upper lobe of the caudal and the upper margin of the dorsal stained black; pectoral in the young yellowish, but in the adult of a deep blue-black, except the elongated ray, which is usually uncoloured in its posterior three fourths; ventral and anal uncoloured.

Hab. Orissa, Bengal, Cachar, and Burma, in which latter country I have taken it as high up as Mandalay. This fish attains at least 16 inches in length.

499. (9.) Engraulis breviceps.

Engraulis breviceps, *Cantor, J. A. S. B.* xviii, p. 1288; *Catal. Mal. Fish.* p. 306; *Day, Fish. India*, p. 628 (see synon.).

B. xvi–xix. D. 1 + 17. P. 14. V. 7. A. 60–64. C. 17. L. l. 54–56. L. tr. 14.

Length of head 7 to $7\frac{2}{5}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $5\frac{1}{2}$ to 6 in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 to $1\frac{1}{2}$ apart. Lower jaw slightly the longer; maxilla truncated opposite the mandibular joint. *Fins*—pectoral

with its upper ray prolonged. Anal commences somewhat in advance of the dorsal, the length of its base being equal to half the total length excluding the caudal fin. *Scales*—the whole of the abdominal edge serrated. *Colour*—greenish yellow on the back, becoming silvery on the sides and beneath; the body with some dark blotches in its upper half. Fins yellow, the dorsal, caudal, and last half of the anal having dark margins.

Hab. Bay of Bengal to the Malay Archipelago.

500. (10.) **Engraulis taty.**

Engraulis taty, *Cuv. & Val. H. N. Poiss.* xxi, p. 60; *Day, Fish. India*, p. 628, pl. clviii, fig. 5 (see synon.).

B. xi–xii. D. 1+13–15. A. 51–57. C. 19. L. l. 42–46. L. tr. 12.

Length of head 6 to $6\frac{1}{2}$ ($5\frac{1}{2}$ in the very young), height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter 4 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and $1\frac{1}{2}$ apart. The maxilla extends backwards beyond the mandibular joint, posteriorly it is truncated. *Fins*—the anal is nearly half as long as the total length excluding the caudal fin; it begins below the middle of the dorsal; first pectoral ray having (but not invariably) a long filamentous ending. Caudal lobed, the lower the longer. *Scales*—12 scutes posterior to the base of the ventral fin, and about 23 anterior to it. *Colour*—upper surface of head and back green or greenish yellow, sparingly dotted with black; sides, abdomen, cheeks, and opercles silvery; dorsal, caudal, and anal yellow, some black dots on dorsal. Ventrals and pectorals yellowish, the latter sometimes dark. The edges and posterior margins of the caudal blackish.

Hab. Seas and estuaries of India and the Malay Archipelago. This fish attains at least 6 inches in length, and is eaten either fresh or salted.

501. (11.) **Engraulis purava.**

Engraulis purava, *Cuv. & Val. H. N. Poiss.* xxi, p. 65; *Day, Fish. India*, p. 628, pl. clvii, fig. 2 (see synon.).

Pussai, Ooriah; *Nga bah* and *Showk-a-thin*, Arracan; *Peddah-poor-awah*, Tel.

B. xii. D. 1+13. P. 15. V. 6. A. 45–47. L. l. 46. L. tr. 12.

Length of head $5\frac{3}{4}$ to 6, height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $\frac{3}{4}$ diam. from end of snout, and 1 apart. The maxilla reaches nearly to the base of the pectoral fin. *Fins*—pectoral reaches the ventral, which does not extend halfway to the base of the anal. Anal commences beneath the posterior dorsal rays. *Scales*—in regular horizontal lines, with a fine row at the base of the dorsal and anal fins; there are 15 or 16 spiny scales between the throat and the base of the ventral fin, and 10 or 11 between the ventral and the base of the

anal. *Colour*—silvery, steel-blue along the back, and with a golden tinge about the head. Dorsal and caudal fins yellowish; the others uncoloured.

Hab. Seas and estuaries of Sind and both sides of India, also the Malay Archipelago; attaining at least 12 inches in length.

502. (12.) **Engraulis commersonianus.**

Stolephorus commersonianus, *Lacépède, H. N. Poiss.* v, p. 382, t. xii, fig. 1.

Engraulis commersonianus, *Day, Fish. India*, p. 629, pl. clviii, fig. 1 (see synon.).

B.xi–xiii. D.14–16. P.15–16. A.19–21. C.19. L.l.38–40. L.tr.8–9.

Length of head 5 to $5\frac{1}{4}$, height of body $5\frac{1}{4}$ to $5\frac{3}{4}$ in total length. *Eyes*—$3\frac{1}{2}$ diameters in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ diam. from end of snout, and nearly 1 apart. Snout projecting considerably beyond and overhanging the mouth. The maxilla continued to the gill-opening. *Fins*—dorsal commences behind ventrals. Anal commences below middle of dorsal. Pseudobranchiæ well developed. *Colour*—silvery, greenish above; opercles shining silvery shot with gold. A large black spot, sometimes indistinct, just behind the occiput. A broad silvery band passes from the centre of the gill-opening to the tail, becoming wider behind. Abdomen light buff-colour. Fins yellowish, with minute black dots. Eyes silvery: orbital margin dark.

Hab. Seas of India to the Malay Archipelago. This attains to about 8 inches in length, and is much esteemed for eating. It is known as "Whitebait" amongst Europeans, and is captured in India in great numbers. In the Straits Cantor states that large quantities are preserved for exportation to China and India.

503. (13.) **Engraulis indicus.**

Engraulis indicus, *V. Hasselt, Algem. Konst.-Letterb.* 1823, p. 329; *Day, Fish. India*, p. 629, pl. clviii, fig. 3 (see synon.).

Nattoo, Tel.; *Nettellee*, Tam.; *Zoo-roo-cart-dah*, Andam.

B. xi–xiii. D. 15–16. P. 15. V. 7. A. 19. C. 19. L. l. 40. L. tr. 8–9.

Length of head $4\frac{2}{3}$ to 5, height of body 6 to $6\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{2}{3}$ to $\frac{3}{4}$ diam. from end of snout, and 1 apart. Maxilla truncated opposite the mandibular joint. *Fins*—first half of dorsal in advance of the origin of the anal. *Scales*—very deciduous; 4 scutes before the base of the ventral fin. Pseudobranchiæ present. *Colour*—silvery, dashed with green along the back, and sometimes some dark spots behind the occiput. A brilliant silvery band passes from opposite the upper edge of the eye to the middle of the caudal fin.

Hab. Seas of India to the Malay Archipelago, ascending tidal rivers.

504. (14.) Engraulis tri.

Engraulis tri, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Haring.* p. 40; *Day, Fish. India*, p. 630, pl. clviii, fig. 6 (see synon.).

B. xi. D. 1+14–15. P. 13. V. 7. A. 20–22. C. 17. L. l. 38. L. tr. 8.

Length of head 5 to $5\frac{1}{4}$, height of body 5 to $5\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diam. from end of snout, and 1 apart. Snout projecting considerably beyond the jaws. Maxilla reaching to the gill-opening. *Fins*—ventrals inserted on a line anterior to origin of dorsal. Anal commences under middle of dorsal. *Scales*—regularly arranged and not very deciduous. Four long slender scutes before ventral fin. *Colour*—silvery shot with purple. A silvery band passes from opposite the eye to the base of the caudal fin; a dark spot behind occiput.

Hab. From Bombay through the seas and estuaries of India to the Malay Archipelago. This fish ascends the Hooghly as high as Calcutta. It attains about 4 inches in length.

8. Genus COILIA, Gray.

Syn. *Mystus*, Lacép.; *Trichosoma*, Swains.; *Chætomus*, McClelland; *Collia*, Schleg.; *Leptonurus*, Bleeker.

Branchiostegals nine to eleven. Body elongated, compressed, and tapering to a pointed tail; abdomen trenchant and serrated. Snout pointed and projecting. Mouth cleft to behind the eye; the maxilla produced behind. Teeth on the jaws, vomer, palatine, and pterygoid bones, also on the tongue. A single rather short dorsal fin placed in the anterior portion of the back; anal elongated and confluent with the caudal; some of the upper pectoral rays produced into moderately thick filaments. Scales of moderate or small size.

Geographical Distribution. Indian and Chinese seas and estuaries.

Synopsis of Indian Species.

A. The maxilla does not extend behind the head.
- P. 5–6+xii, A. 116, L. l. 55 .... 1. *C. reynaldi*, p. 396.
- P. 6+vi, A. 95–110, L. l. 70 .... 2. *C. ramcarati*, p. 396.
- P. 6+vi, A. 75, L. l. 58 .... 3. *C. cantoris*, p. 396.
- P. 6+vi, A. 42...................... 4. *C. quadrigesimalis*, p. 397.

B. The maxilla extends behind the head.
- P. 9+v-vi, A. 105. Two or three rows of round yellow spots .... 5. *C. dussumieri*, p. 397.
- P. 6+ix–xii, A. 77–95. No spots .... 6. *C. borneensis*, p. 398.

505. (1.) Coilia reynaldi.

Coilia reynaldi, *Cuv. & Val. H. N. Poiss.* xxi, p. 81; *Day, Fish. India*, p. 630 (see synon.).

B.ix. D.1+14. P.5–6+xii. V.6. A.116. C.10. L.l.55. L.tr.10–11.

Length of head 7, height of body 6 in the total length. *Eyes*—diameter 4 in length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. The maxilla extends nearly to the end of the opercles. *Fins*—the dorsal commences in the first fourth of the total length; the anal under the dorsal or slightly behind its posterior margin; a spine just before the dorsal. Pectoral short, the upper rays prolonged nearly to the middle of the body. Anal more than two thirds the total length. *Scales*—12 sharp spines along the abdominal edge, which is serrated in front of the ventrals. *Colour*—silvery white, with pinkish reflexions.

Hab. The Hooghly at Calcutta.

506. (2.) Coilia ramcarati.

Mystus ramcarati, *Ham. Buch. Fish. Ganges*, pp. 233, 382.
Coilia ramcarati, *Day, Fish. India*, p. 631, pl. clix, fig. 2 (see synon.).

B. xi. D. 1+14. P. 6+vi. V. 12. A. 95–110. L. l. 70. L. tr. 9–10.

Length of head 6, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter 5 in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{3}$ apart. Maxilla dilated above the mandibular joint, behind which it is truncated. The distance between the snout and dorsal fin is one fourth of the total length. *Fins*—the six lower pectoral rays are very short and almost concealed in a scaly sheath; the free ones reach to about the middle of the length of the fish. Ventral inserted slightly before the front edge of the dorsal. The length of the anal is about two thirds of the distance between the gill-opening and base of the caudal fin, the upper ray of the latter fin being the longest. *Scales*—5 spiny before and 10 or 11 behind base of ventral fin. Pseudobranchiæ present. *Colour*—generally golden, with a darkish stain behind the gill-opening. The last half of the anal and the whole of the caudal blackish.

Hab. Rivers and estuaries of Bengal.

507. (3.) Coilia cantoris.

Coilia cantoris, *Bleeker, Batav. Genootsch. Verhand.* xxv, *Beng.* pp. 74, 148; *Day, Fish. India*, p. 631.

Nga kyang uét, Burmese.

B. ix. D. 1+13. P. 6+vi. V. 7. A. 75. C. 10. L. l. 58.

Length of head 6, height of body $6\frac{1}{3}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $\frac{2}{3}$ diam. from end of snout. The maxilla not extending to the branchial aperture. *Fins*—dorsal commencing in the second fourth of the length of the body.

Pectoral rays short, the free ones not reaching so far as to the anal fin. Length of base of anal rather above one half the total length. *Scales*—5 spines on the abdominal edge before the ventral fin and 10 behind it. *Colour*—without marks.

Hab. One young example, nearly 4 inches long, was captured in the Hooghly. The above description is from the type.

508. (4.) **Coilia quadrigesimalis.**

Coilia quadragesimalis, *Cuv. & Val. H. N. Poiss.* xxi, p. 83; *Day, Fish. India*, p. 631 (see synon.).

B. x. D. 15. P. 6+vi. V. 8. A. 42. C. 25.

Height of body $4\frac{3}{4}$ in the total length. *Eyes*—small. Mouth obtuse; the maxilla does not extend posteriorly behind the angle of the jaw. *Fins*—dorsal inserted at the posterior end of the first third of the body. Pectoral short, its six free rays equal to one half the total length. The anal commences a little before the middle of the total length. *Colour*—silvery shot with gold, and having nacreous reflexions; fins yellowish.

Hab. One example, 6 (French) inches long, from the Ganges.

509. (5.) **Coilia dussumieri.** (Fig. 122.)

Coilia dussumieri, *Cuv. & Val. H. N. Poiss.* xxi, p. 81, pl. 610; *Day, Fish. India*, p. 631, pl. clviii, fig. 8 (see synon.).

Oorialli, Ooriah; *Mándeli*, Maráthi.

B. xi. D. 1+13-14. P. 9+v-vi. V. 7. A. 105. C. 12. L. l. 80. L. tr. 9.

Length of head 6 to $6\frac{1}{3}$, height of body $5\frac{1}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{4}$ in length of head, $\frac{3}{4}$ diam. from end of snout, and $1\frac{1}{4}$ apart. Maxilla extending posteriorly to the gill-

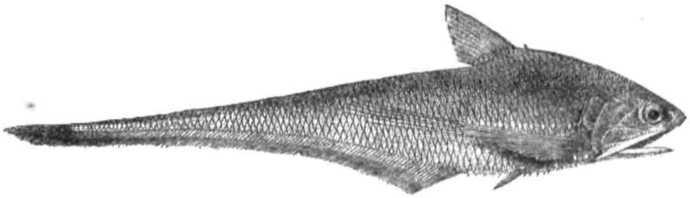

Fig. 122.—*Coilia dussumieri.*

opening. Snout projecting beyond the mouth. The distance between the snout and the first dorsal ray is one fourth of the total length. *Fins*—6 upper pectoral rays produced to about the middle of the length of the fish. Ventral inserted below middle of dorsal fin. Length of base of anal nearly equal to three fourths of distance between gill-opening and base of caudal fin, the upper ray of

which is the longest. *Scales*—5 or 6 spiny before ventral fin, and 8 behind it; they commence just behind the insertion of the pectoral fin. Pseudobranchiæ absent. *Colour*—golden, with two or three rows of round burnished golden spots along the lower half of the side.

Hab. Seas and estuaries of India to the Malay Archipelago; very numerous at Bombay. Attaining at least 7 inches in length.

510. (6.) **Coilia borneensis.**

Coilia borneensis, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Haring.* p. 45; *Day, Fish. India*, p. 632, pl. clix, fig. 1 (see synon.).

B. x. D. 1+14. P. 6+ix–xii. V. 7. A. 77–95. L. l. 76. L. tr. 9.

Length of head $5\frac{1}{2}$ to $6\frac{1}{2}$, height of body 5 to $5\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to $5\frac{1}{2}$ in length of head, 1 diam. from end of snout, and $1\frac{1}{4}$ apart. Maxilla continued backwards as far as the gill-opening. The distance between the snout and the dorsal fin is one fourth of the total length. *Fins*—the 6 lower pectoral rays short; the 12 upper ones extend almost to the middle of the length of the fish. The base of the anal equals two fifths of the distance between the snout and the base of the caudal. *Scales*—4 or 5 fine spines along the abdominal edge between the bases of the pectoral and ventral fins; 5 behind the latter. *Colour*—golden; fins yellowish, without any black marks.

Hab. Madras, Burma (where it is common in the Irrawaddy river), also the Malay Archipelago.

Fourth group. DUSSUMIERINA.

9. Genus **DUSSUMIERIA**, Cuvier & Valenciennes.

Branchiostegals numerous; pseudobranchiæ well developed. Gill-membranes entirely separate. Body somewhat elongate, compressed; abdomen rounded, not serrated. Snout pointed; upper jaw not projecting; cleft of mouth moderate. Eyes with broad adipose lids. Small fixed teeth in the jaws, and villiform teeth on the palatines, pterygoids, and the tongue, but absent from the vomer. Dorsal fin opposite to the ventral; anal of moderate length. Scales of medium or rather small size, very deciduous. Pyloric appendages numerous.

Geographical Distribution. From Sind throughout the seas of India to the Malay Archipelago and China.

Synopsis of Indian Species.

L. l. 52–56 .... 1. *D. hasseltii*, p. 399.
L. l. 40–42 .... 2. *D. acuta*, p. 399.

511. (1.) Dussumieria hasseltii.

Dussumieria hasseltii, *Bleeker, Batav. Genootsch. Verhand.* xxiv, *Chiroc.* p. 13; *Day, Fish. India*, p. 647, pl. clxvi, fig. 5 (see synon.).

B. xv–xix. D. 17–20. P. 15. A. 15–16. C. 19. L. l. 52–56. L. tr. 12.

Length of head $4\frac{1}{2}$ to 5, height of body $5\frac{2}{3}$ to $6\frac{1}{3}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{4}$ in length of head. *Fins*—ventral inserted beneath the last half of the dorsal. *Gill-rakers*—rather widely set, the longest being about one half as long as the eye, and 19 on the lower branch of the outer branchial arch. *Colour*—a beautiful green shot with blue. Upper margin of the opercle and along the back light blue, below is a bronzed line, and below that again a silvery one shot with pink. Caudal shot with blue, green, and gold. Upper surface of head and eye emerald-green. Pectoral, ventral, and anal white, except the first ray of the pectoral which has a little black on it. Dorsal yellowish green. End of snout greenish. Eyes white.

Hab. From Canara and the Coromandel Coast of India to the Malay Archipelago and China. The largest example obtained in Canara was 8 inches long. This species is not nearly so common as *D. acuta.*

512. (2.) Dussumieria acuta. (Fig. 123.)

Dussumieria acuta, *Cuv. & Val. H. N. Poiss.* xx, p. 467, pl. 606; *Day, Fish. India*, p. 647, pl. clxvi, fig. 4 (see synon.).

Poonduouringa, Tam.; *O-pul-dah*, Andam.; *Marrawa*, Tel.

B. xiv–xv. D. 19–20. P. 14. A. 14–17. C. 21. L. l. 40–42. L. tr. 11–12.

Length of head 5 to $5\frac{1}{2}$, height of body 5 to $5\frac{1}{4}$ in the total

Fig. 123.—*Dussumieria acuta.*

length. *Eyes*—diameter 4 in length of head. Abdominal profile more convex than that of the back. *Gill-rakers*—rather widely set, one half as long as the eye, and about 22 in the horizontal branch of the outer branchial arch. *Colour*—the same as in *D. hasseltii.*

Cantor says this species has been preserved *à l'huile.* It is

termed a Sardine by the inhabitants and residents in Malabar, where it is very common and is excellent eating.

Hab. From Sind through the seas of India to the Malay Archipelago; attaining at least 7 inches in length.

10. Genus **SPRATELLOIDES**, Bleeker.

Branchiostegals six; pseudobranchiæ well developed. Gill-membranes entirely separated. Body elongated, moderately compressed or subcylindrical; abdomen rounded. Snout compressed; the upper jaw not overlapping the lower. Eyes without adipose lids. Teeth small and deciduous, but sometimes present on the jaws, vomer, pterygoids, and tongue. Dorsal fin placed opposite the ventrals; anal of moderate length or short. Scales of medium size, rather deciduous.

Geographical Distribution. Western coast of India, Malay Archipelago to Australia, also the North Pacific.

513. (1.) **Spratelloides malabaricus.** (Fig. 124.)

Spratelloides malabaricus, *Day, P. Z. S.* 1873, p. 240; *Fish. India*, p. 648, pl. clxi, fig. 5 (see synon.).

D. 13–14. P. 13. V. 8. A. 18–19. C. 19. L. l. 38. L. tr. 9.

Length of head (proportion increases with age) $4\frac{1}{2}$ to $5\frac{3}{4}$, height of body $5\frac{1}{4}$ in the total length. *Eyes*—diameter one third of length of head. *Fins*—dorsal commences slightly in front of the

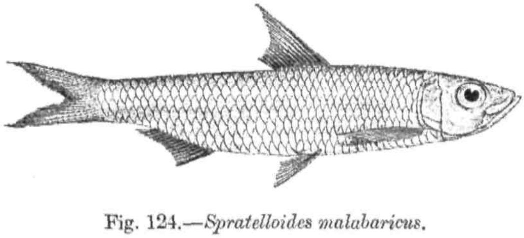

Fig. 124.—*Spratelloides malabaricus.*

origin of the ventral; caudal deeply forked. *Colour*—light yellowish green above, a silvery stripe along the side, abdomen silvery; upper caudal lobe with a bluish posterior edge; some fine black points along the back; upper edge of eye dark green.

Hab. Western coast of India, in rivers and estuaries, attaining 3 inches in length, and not uncommon.

Fifth group. ALBULINA.

11. Genus **ALBULA**, Gronovius.

Syn. *Butyrinus*, Lacép.; *Glossodus* (Cuv.), Agassiz; *Conorhynchus* (Nozeman), Bleeker, Atl. Ich.

Gill-membranes entirely separated. Body oblong or elongate. Abdominal edge rounded and not keeled. Snout pointed, projecting beyond the mouth. Eyes with a broad annular adipose membrane. Villiform teeth on the jaws, vomer, and palatine bones; granular on the tongue, pterygoid and sphenoid bones. Dorsal fin situated opposite to the ventrals; the anal shorter than the dorsal. Scales rather small, not deciduous; lateral line present. Pseudobranchiæ well developed.

514. (1.) **Albula conorhynchus.**

Albula conorhynchus, *Bl. Schn. Syst. Ich.* p. 432, t. 86; *Day, Fish. India*, p. 648 (see synon.).

B. xiv–xvi. D. 17–19. A. 9. L. l. 75–80. L. tr. 9–8/11–9. Vert. 41/26. Cæc. pyl. 22.

Length of head $4\frac{1}{2}$ to 5, height of body $5\frac{1}{2}$ to $6\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 in the length of the head, 1 to $1\frac{1}{3}$ diam. apart. The maxilla reaches to below the front edge of the eye. *Fins*—the ventral inserted beneath the last half of the dorsal. *Colour*—silvery.

Hab. Coasts of India and all tropical and subtropical seas.

Sixth group. ELOPINA.

12. Genus **ELOPS**, Linnæus.

Branchiostegals numerous; pseudobranchiæ. Gill-membranes entirely separated. Body rather elongate and compressed. An osseous gular plate is attached to the symphysis of the mandibles and covers the intermediate area. Mouth wide, anterior; lower jaw slightly the longer. Villiform teeth in the jaws, vomer, palatine and pterygoid bones, also on the tongue and base of the skull. Ventrals opposite to the dorsal, which has a few rays more than the anal. Scales small. Lateral line distinct. Pyloric appendages numerous.

515. (1.) **Elops saurus.** (Fig. 125.)

Elops saurus, *Linn. Syst. Nat.* i. p. 518; *Day, Fish. India*, p. 649, pl. clxvi, fig. 1 (see synon.).

Jallugu and *Jinnagow*, Tel.; *Ullahti*, Tam.; *Shonas*, Maráthi.

B. xxix–xxxv. D. 22–24. A. 15–17. C. 19. L. l. 95–100. L. tr. 12/14.

Length of head $4\frac{1}{2}$ to 5, height of body 5 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to 5 in length of head, $\frac{3}{4}$ to 1

diam. from end of snout, and the same apart. Cleft of mouth oblique; the maxilla extends to rather behind the posterior margin

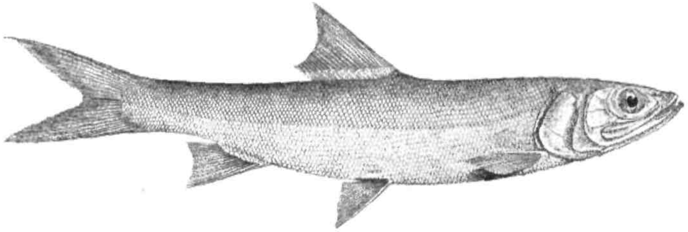

Fig. 125.—*Elops saurus.*

of the orbit. *Fins*—anal rather more concave than the dorsal: caudal deeply lobed. *Scales*—a few fine rows form a sort of sheath to dorsal and anal fins, also some over the root of caudal. *Colour*—silvery; fins yellowish, with a greenish tinge.

Hab. Tropical and subtropical seas; attaining a considerable length.

13. Genus **MEGALOPS**, Commerson.

Branchiostegals numerous: pseudobranchiæ absent. Gill-membranes entirely separated. Body oblong and compressed. Mouth anterior, lower jaw prominent. A narrow bony plate adherent to the symphysis of the mandibles, and covering the space intermediate between the two bones. Villiform teeth in the jaws, vomer, palatine and pterygoid bones, also on the base of skull and on the tongue.

Geographical Distribution. All tropical seas and many fresh waters.

516. (1.) **Megalops cyprinoides.** (Fig. 126.)

Clupea cyprinoides, *Broussonet, Ich.* t. ix.
Megalops cyprinoides, *Day, Fish. India*, p. 650, pl. clix, fig. 3 (see synon.).

Kundinga, Tel.; *Punnikowu* and *Naharm*, Ooriah; *Cunnay*, Mal.; *Moran cundai*, Tamil; *Nga-tan-youet* and *Nga Koonya*, Burmese.

B. xxiv–xxvi. D. 19–21. A. 24–27. C. 19. L. l. 37–42. L. tr. 5–6/6.

Length of head $4\frac{1}{4}$ to 5, height of body $4\frac{1}{2}$ to 5 in the total length. *Eyes*—with narrow adipose lids, diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in the length of head, about $\frac{1}{2}$ a diameter from end of snout and also apart; the size of the eye in large specimens is frequently comparatively larger than in small ones. *Fins*—dorsal commences opposite the ventral, and is two thirds as high as the body below it, its upper edge concave, and its last ray prolonged. Caudal deeply lobed. *Colour*—back bluish green in the adult, lighter in the immature. Abdomen silvery,

with bluish reflexions. The margins of the scales of a brilliant silver, as are also the lateral line and the sides of the head. The

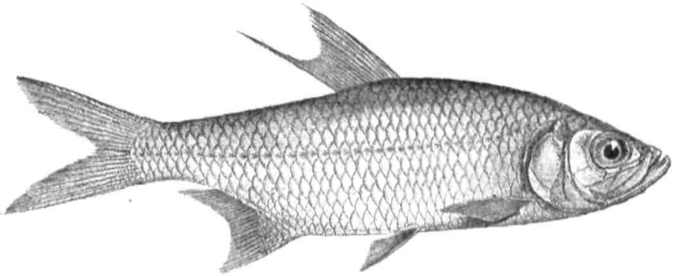

Fig. 126.—*Megalops cyprinoides.*

centre of the jaws black. Dorsal and caudal greyish, minutely dotted with black, and the margins blackish, as is also the last elongated dorsal ray. Pectoral, ventral, and anal diaphanous, with some black dots, the last anal ray dark. The pupils are oval, pointing downwards.

Hab. Indian and Pacific Oceans, waters and estuaries of India, Ceylon, &c.; occasionally captured in rivers, but much more commonly found in tanks.

Sixth group. CHANINA.

14. Genus **CHANOS**, Lacépède.

Syn. *Lutodeira* (Kuhl), Rüppell.

Branchiostegals four; pseudobranchiæ present. Gill-membranes entirely united below and not attached to the isthmus. Body moderately elongate and compressed; abdomen rounded. An accessory branchial organ in a recess behind the true gill-cavity. Mouth small. Teeth absent. Ventral fin opposite the dorsal, which has more rays than the anal. Caudal deeply cleft. Scales rather small. Lateral line distinct. Air-bladder with a constriction. Pyloric appendages numerous.

Geographical Distribution. Indian and Pacific Oceans.

517. (1.) **Chanos salmoneus.** (Fig. 127.)

Mugil chanos, *Forsk. Descr. Anim.* p. 74, no. 110.
Mugil salmoneus, *Bl. Schn. Syst. Ich.* p. 121.
Chanos salmoneus, *Day, Fish. India.* p. 651, pl. clxvi, fig. 2 (see synon.).

Tulu candal, Tam.; *Palah bontah*, Tel.; *Hu-meen*, Canar.; *Pu-meen*, Tulu.

D. 13–16. P. 16. A. 9–10. L. l. 80–90. L. tr. 12/15. Vert. 19/26.

Length of head $5\frac{1}{4}$ to $5\frac{1}{2}$, height of body $4\frac{2}{3}$ to $5\frac{1}{4}$ in the

has D. 17, A. 24. No ventral fins are shown, and the vent is placed in the centre of the length of the body. Dorsal fin commences slightly in advance of the anal and in the commencement of last third of the total length; caudal forked. *Colour*—a row of black spots along the edge of the abdomen. Sufficient details are not given to enable one to decide on the position it should hold. In the absence of ventral fins, which may have been overlooked, it somewhat approaches the *Leucopsarion petersii* of Hilgendorf.

Family VIII. NOTOPTERIDÆ.

Pseudobranchiæ absent. Body compressed. Tail prolonged, tapering. Margin of the upper jaw formed by the premaxillaries mesially and the maxillaries laterally. No subopercle. A parieto-mastoid cavity on either side of the head connected with the interior of the skull. Barbels absent. Dorsal fin, if present, single, and belonging to the caudal portion of the vertebral column; ventrals rudimentary or absent: anal fin with numerous rays and confluent with the caudal. Head and body with small scales. Lateral line present. Abdominal edge serrated in front of the ventral fins. Stomach without any blind sac. Two pyloric appendages. Air-bladder present, and subdivided internally. The ova fall into the cavity of the abdomen before exclusion.

1. Genus **NOTOPTERUS**, Lacépède.

Syn. *Mystus*, sp., Ham. Buch.; *Xenomystus*, Günther.

Branchiostegals from 3 to 9. Gill-membranes partly united. Snout obtuse, convex. Muciferous channels on head well developed. Preopercle and occasionally some of the other bones of the head serrated. Teeth in jaws, vomer, palatine and sphenoid bones, also on the tongue. Intestines short. Cæcal pylori long.

Geographical Distribution. Fresh and brackish waters of West Africa, also of the continent of India and the Malay Archipelago.

Synopsis of Indian Species.

Maxilla not extending beyond hind edge of orbit .. 1. *N. kapirat*, p. 406.
Maxilla extending far beyond hind edge of orbit .. 2. *N. chitala*, p. 407.

519. (1.) **Notopterus kapirat.** (Fig. 129.)

Gymnotus notopterus, *Pallas, Spic. Zool.* vii. p. 40, t. vi, fig. 2.
Notopterus kapirat, *Lacép. H. N. Poiss.* ii. p. 190; *Day, Fish. India*, p. 653, pl. clix, fig. 4 (see synon.).

Moh, *But*, and *Purri*, Punj.; *Moh*, N.W. Prov.; *Pholo*, Beng.; *Ambutan-wahlah*, or 'Barber's knife,' and *Chota wahlah*, Tam.; *Wallak-tattah*, Mysore; *Pulli*, or 'a slice,' Ooriah; *Kan-doo-lee*, Assam; *Nga-phé*, Burm.; *Chálat* and *Chambaree*, Maráthi.

B. viii. D. 7–8. V. 5–6. A. 100–110. C. 19. L. r. 225. Vert. 15/54.

Length of head 5 to 5½, height of body 3½ to 4 in the total length. *Eyes*—diameter 4½ to 5 in the length of head. Dorsal profile not so convex as that of the abdomen. The maxilla reaches

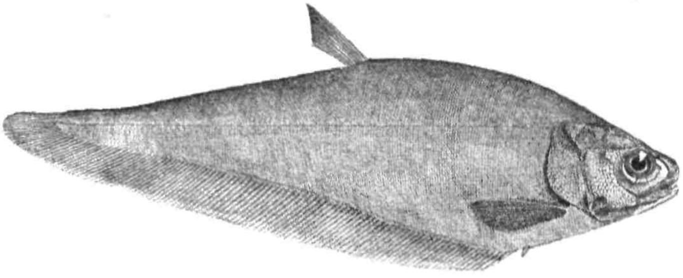

Fig. 129.—*Notopterus kapirat.*

to below the middle of the orbit. Preorbital serrated. *Fins*—dorsal commences nearly midway between the snout and the end of the caudal fin. *Scales*—those on the cheeks much larger than those on the body; about 28 serrations along the abdominal edge between the throat and the insertion of the ventral fin. *Colour*—silvery, darkest on the back; some gloss of yellow about the head. Numerous fine greyish spots everywhere. Upper surface of dorsal whitish. Eyes golden.

Hab. Fresh and brackish waters of India to the Malay Archipelago. Grow to 2 feet or more in length.

520. (2.) Notopterus chitala.

Mystus chitala, *Ham. Buch. Fish. Ganges*, pp. 236, 382.
Notopterus chitala, *Day*, *Fish. India*, p. 654, pl. clix, fig. 5 (see synon.).

Chitul, Ooriah; *See-tul*, Assam.; *Gundun*, Sind.; *Chitala*, Beng.

B. viii–ix. D. 9–10. A. 110–125(135). C. 12–14. L. l. 180. Cæc. pyl. 2.

Length of head 4½ to 5, height of body 3½ to 4 in the total length. *Eyes*—diameter 7 to 8 in the length of the head. Dorsal profile very convex, abdominal nearly straight. Upper profile of head deeply concave. Snout rather prominent; the maxilla extends posteriorly to about the diameter of the eye behind the hind edge of the orbit. Preorbital entire. *Fins*—dorsal much nearer to tail than to snout. *Scales*—those on the head not much larger than those on the body. There are about 51 serrations along the

abdominal edge between the throat and the insertion of the ventral fin. *Colour*—coppery brown above, with about 15 transverse silvery bars joining over the back; sides silvery; fins stained with greyish spots, which are like black stars in the caudal region, placed in a single or double row close to the anal fin and sometimes extending the whole length of its base.

Hab. Fresh waters of Sind, Lower Bengal, Orissa, Assam, Burma, and Siam to the Malay Archipelago; attaining at least 4 feet in length.

Family IX. SCOPELIDÆ.

Branchiostegals as a rule numerous. Pseudobranchiæ well developed. Gill-openings very wide. Opercular pieces sometimes incomplete. Margin of the upper jaw formed by the premaxillaries. Barbels absent. Two dorsal fins, the posterior adipose. Scales present or absent. Ova enclosed in sacs in the ovaries and excluded by oviducts. Intestinal canal short. Pyloric appendages, when present, few in number. Air-bladder small or absent.

Geographical Distribution. Throughout tropical, subtropical, and temperate seas. These fishes in many respects are allied to the Siluroids.

Synopsis of Indian Genera.

Caudal forked. V. 8, the inner rays much the longest ..	1. SAURUS.
Caudal forked. V. 9, inner rays scarcely longer than outer	2. SAURIDA.
Bones of head soft. V. 9. Caudal trilobed	3. HARPODON.
Bones of head ossified. Caudal forked. Luminous spots along the body	4. SCOPELUS.

1. Genus SAURUS, Cuvier.

Syn. *Synodus*, pt., Gronovius; *Laurida*, pt. (Aristotle), Swainson.

Branchiostegals 8–17. Gill-membranes not attached to the isthmus. Body elongate, subcylindrical. Gape of mouth wide, cleft very deep; edge of the upper jaw entirely formed by long and thin premaxillaries; the maxillary likewise elongate, thin, and adherent to the premaxillaries. Teeth numerous, pointed, some are elongate, slender, and can be laid downwards and inwards; they exist on the jaws, tongue, and palatine bones, a single band on the palate and usually none or only a few on the vomer. First dorsal situated nearly in the middle of the length of the fish; adipose fin small. Ventral with eight rays, the inner the longest; it is inserted further in front than the origin of the dorsal and not far behind the pectorals, which are short; anal of moderate length or short. Caudal forked. Scales of moderate size. Lateral line entire. Pyloric appendages free.

Geographical Distribution. Tropical portions of the Atlantic and Pacific Oceans; Mediterranean.

Synopsis of Indian Species.

A. 9. Head pointed .... 1. *S. indicus*, p. 409.
A. 16–17. Snout obtuse .... 2. *S. myops*, p. 409.

521. (1.) **Saurus indicus.**

Saurus indicus, *Day, Fish. India*, p. 503, pl. cxvii, fig. 4.

B. xv. D. 13. P. 14. V. 8. A. 9. C. 19. L. l. 55–57. L. tr. $3\frac{1}{2}/7$.

Length of head $4\frac{1}{2}$, height of body $7\frac{1}{2}$ to 8 in the total length. *Eyes*—diameter $5\frac{2}{3}$ in length of head, rather more than 1 diam. from end of snout, and nearly 1 apart; the width of the snout at its base equals its length. Interorbital space somewhat concave. Upper jaw slightly the longer. Cleft of mouth extending to far behind the eyes. *Teeth*—inner row in the jaws the longest, some in the mandible barbed. Five rows of large teeth on the tongue. A single band on the palatines of which the inner row is much the largest. *Fins*—dorsal about as long as high. Inner ventral rays the longest, the fin reaches nearly halfway to the base of the anal. *Colour*—brownish in the upper two thirds, dirty white beneath. Numerous bluish irregular spots or blotches along the back and sides, in places almost forming horizontal bands. Dorsal and caudal white, with greyish spots, forming irregular horizontal bands.

Hab. Madras; growing to 7 inches in length.

522. (2.) **Saurus myops.** (Fig. 130.)

Salmo myops (*Forst.*), *Bl. Schn. Syst. Ich.* p. 421.
Saurus myops, *Day, Fish. India*, p. 504, pl. cxvii, fig. 5 (see synon.).

B. xvi. D. 12–13. A. 16–17. C. 17–19. L. l. 52–56. L. tr. $3\frac{1}{2}/7$.

Length of head $4\frac{1}{4}$, height of body 6 in the total length. *Eyes*

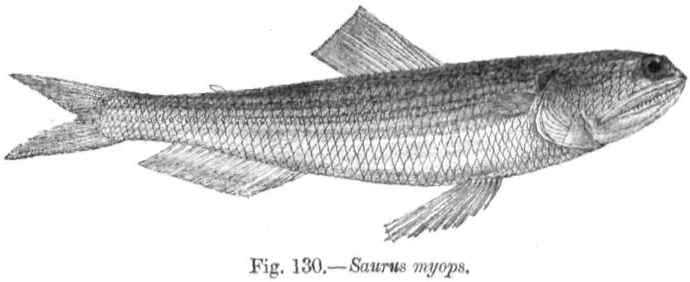

Fig. 130.—*Saurus myops.*

—diameter 6 in length of head, $\frac{1}{2}$ to $\frac{3}{4}$ diam. apart, and also from the end of snout. Dorsal profile nearly horizontal. Cleft

of mouth extending to at least two diameters behind the orbit; jaws of about equal length. Interorbital space deeply concave. *Teeth*—pointed, two rows in the upper, three in the lower jaw, the inner the longest. A single two-rowed band on the palate. Tongue likewise toothed. *Fins*—first dorsal commences midway between the snout and the second dorsal; second dorsal very small. Caudal with its lower lobe the longer. *Lateral line*—slightly raised in single tubes, with a small elevation on either side. *Colour*—upper half of body golden, with four longitudinal blue lines having black edges, and nearly as wide as the ground-colour. A black spot at shoulder. Abdominal surface silvery. Dorsal fin with three rows of yellow spots; a yellow band along the middle of the pectoral; outer half of anal yellow.

Hab. Seas of India to the Malay Archipelago and the tropical portions of the Atlantic and Pacific Oceans. The species attains to 16 inches at least in length.

2. Genus **SAURIDA**, Cuvier & Valenciennes.

Syn. *Synodus*, pt., Gronovius; *Laurida*, pt. (Artedi), Swainson.

Differs from *Saurus* as follows:—Teeth cardiform, the inner the longest and slender, all can be laid downwards and inwards; teeth exist on the jaws, tongue, and palatine bones; those on the palate are in two parallel bands on either side, the inner the shorter. Ventral fin with nine rays, the inner not much longer than the outer.

Synopsis of Indian Species.

A. 10–11. L. l. 53–64. L. tr. $4\frac{1}{2}/7$ .... 1. *S. tumbil*, p. 410.
A. 9. L. l. 50–52. L. tr. $3\frac{1}{2}/7$ .... 2. *S. nebulosa*, p. 411.

523. (1.) **Saurida tumbil.** (Fig. 131.)

Salmo tumbil, *Bloch, Ich.* t. 430.
Saurida tumbil, *Day, Fish. India*, p. 504, pl. cxvii, fig. 6 (see synon.).

Arranna, Mal.; *Oolooway* and *Cul-nahmacunda*, Tamil; *Chorbombil*, Maráthi; *Badi mottah*, Tel.

B. xiii–xvi. D. 11–13/0. A. 10–11. L. l. 53–64. L. tr. $4\frac{1}{2}/7$. Vert. 53.

Length of head $4\frac{1}{2}$ to $5\frac{1}{2}$, height of body $7\frac{1}{2}$ to 8 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{4}$ diam. from end of snout, and the same apart. *Fins*—first dorsal in the centre of the body; the adipose dorsal is situated over the last two anal rays. Caudal deeply forked. *Colour*—brownish grey along the back, becoming white beneath, the whole having yellow reflexions. In some the dorsal and upper half of the caudal fins are barred in spots. In others there are no spots, and the middle of the pectoral and ventral are sometimes almost black.

Hab. From the Red Sea through the seas of India to the Malay Archipelago, China and Japan. As food this fish is rather dry and insipid. It attains at least a foot in length.

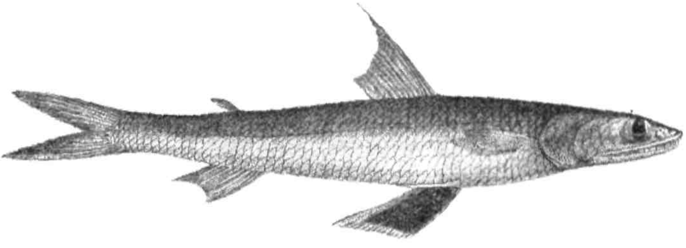

Fig. 131.—*Saurida tumbil.*

524. (2.) **Saurida nebulosa.**

Saurida nebulosa (*Solander*), *Cuv. & Val. H. N. Poiss.* xxii, p. 506; *Day, Fish. India*, p. 505 (see synon.).

B. xii–xiii. D. 10–11/0. P. 12–13. A. 9–10. L. l. 50–52. L. tr. $3\frac{1}{2}/6$.

Length of head $4\frac{3}{5}$ to $5\frac{1}{5}$, height of body $6\frac{1}{2}$ to 9 in the total length. *Eyes*—diameter 4 to $5\frac{1}{2}$ in the length of the head, rather above 1 diameter from end of snout, and $\frac{3}{4}$ to 1 diameter apart. *Fins*—dorsal higher than long. Pectoral reaches to the ninth scale of the lateral line. Ventral as long as the head excluding the snout. *Scales*—forming a slight ridge in the last portion of the lateral line. *Colour*—brownish, becoming lighter below; a series of bars or blotches along the middle of the sides; fins barred.

Hab. From the Red Sea, Madagascar, Zanzibar, and Mauritius, through the seas of India to the Malay Archipelago and beyond.

3. Genus **HARPODON**, Lesueur.

Syn. *Triurus*, Swainson; *Sauridichthys*, Bleeker.

Branchiostegals 23–25. Gill-openings wide. Body elongate and compressed. Eyes small. Snout short, bones of head soft and partly modified into wide muciferous channels. Cleft of mouth deep; margin of upper jaw formed by the premaxillaries, which are thin and tapering; maxillaries absent. Teeth cardiform, recurved and of unequal size, the largest being on the mandibles and barbed. Teeth on the premaxillaries, mandibles, palatines, the tongue and hyoid bone, those on the palatines are large and can be laid downwards. Dorsal fin in the middle of the body; adipose fin small. Anal of moderate length. Caudal trilobed. Scales thin and deciduous, none on the anterior portion of the body. Air-bladder absent. Pyloric appendages 16.

525. (1.) **Harpodon nehereus.** (Fig. 132.)

Osmerus? nehereus, *Ham. Buch. Fish. Ganges*, pp. 209, 380.
Harpodon nehereus, *Day, Fish. India*, p. 505, pl. cxviii, fig. 1 (see synon.).

Bummaloh or "Bombay duck," *Cucah sawahri*, or *Coco mottah*, *Wanah monah*, Tel.; *Bombíl*, Maráthi; *Barega*, Arracan; *Luttia muchee*, Chittagong; *Nga hnat*, Burmese.

D. 12–13 | 0. P. 11–12. V. 9. A. 13–15. C. 19. Vert. 38.

Length of head $5\frac{1}{4}$ to 6, height of body $6\frac{1}{2}$ to $7\frac{1}{2}$ in the total length. *Eyes*—diameter $\frac{1}{16}$ of the length of the head, 2 diameters from end of snout, and 4 apart. Lower jaw the longer. Opercular pieces diaphanous and apparently more or less blended together. *Fins*—ventral opposite the dorsal; the adipose dorsal opposite the posterior third of the anal; ventral reaches to the middle of the anal; caudal divided into three pointed lobes, of which the median is rather the shortest. *Scales*—commence opposite the origin of the dorsal fin, all are diaphanous, and can but

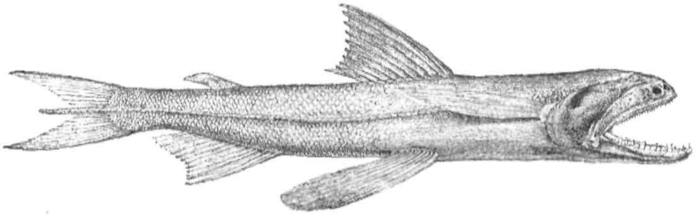

Fig. 132.—*Harpodon nehereus.*

with difficulty be distinguished in the fresh fish. *Lateral line*—slightly keeled, with about forty fine rectangular membranous pieces, covered with scales like the rest of the body. *Colour*—head, back, and sides semitransparent like gelatine, light greyish, with minute black or brownish dots; anterior part of the abdomen pale, silvery bluish; rest greyish white; fins transparent, closely dotted, in some specimens black. Iris golden.

Hab. From Zanzibar to China, throughout the seas and estuaries of India, most common at Bombay, but decreasing in numbers down the Malabar coast. It is not very common at Madras, but augments in numbers up the Coromandel coast, being very abundant in the rivers and estuaries of Bengal and Burmah.

This fish is highly esteemed as food, whether fresh or salted; in the latter form it is extensively employed as a relish with curries, and is known as the "Bombay duck." It attains at least 16 inches in length.

4. Genus **SCOPELUS**, Cuvier.

Syn. *Myctophum* (*Nyctophus*), *Lampanyctus*, Cocco; *Alysia*, Lowe; *Neoscopelus*, Johnson; *Ceratoscopelus*, *Dasyscopelus*, Günther.

Branchiostegals 8–10. Gill-openings very wide. Body oblong and compressed. Eyes large; sometimes a supraorbital spine. Snout short. Bones of head thin, but osseous. Cleft of mouth very deep; premaxillaries long and tapering; maxillaries well developed. Teeth villiform in both jaws, on the palatines, pterygoids, and on the tongue; usually absent from the vomer except in some large specimens. Rayed dorsal fin in about the middle of the length of the body; a small adipose fin likewise present. Pectoral well developed, also the ventral, which has eight rays. Anal rather long. Caudal forked. Scales large, smooth, or with rough edges, or even minute spines. Air-bladder small. Pyloric appendages few.

These fishes have a row of luminous spots along the lower portion of the body; sometimes similar spots are also present on the head, snout, and back of tail, or a few may occur on the sides.

Geographical Distribution. Temperate and tropical seas.

526. (1.) **Scopelus indicus.** (Fig. 133.)

Scopelus indicus, *Day, Fish. India*, p. 507, pl. cxviii, fig. 2.

D. 10/0. P. 14. V. 8. A. 18. L. l. 43. L. tr. $3\frac{1}{2}$/5.

Length of head 5, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in the length of head, $\frac{1}{4}$ diam. from end of snout and also apart. No spine above the orbit. *Fins*—dorsal not quite so high as the body below it. Pectoral reaches the middle of the ventral, whilst the ventral nearly extends to the anal. *Scales*—smooth, the row beneath the lateral line much larger than the

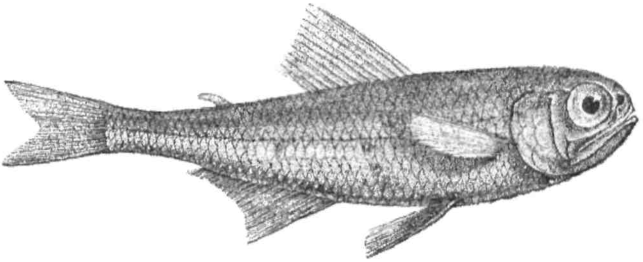

Fig. 133.—*Scopelus indicus.*

others. *Colour*—deep metallic blue in the upper portion of the body, becoming lighter on the sides and beneath. A line of round golden spots along the lower edge of the abdomen, and a few larger ones scattered over the sides.

Hab. A single specimen, now in a bad state, was collected by Sir Walter Elliot at Vizagapatam.

Family X. CYPRINODONTIDÆ.

Pseudobranchiæ absent. Eyes lateral. Margin of the upper jaw formed solely by the premaxillaries. Barbels absent. Teeth in both jaws, also in the superior and inferior pharyngeal bones. A single spineless dorsal fin situated in the posterior half of the body. Scales on head and body. Stomach without any blind sac. No pyloric appendages. Air-bladder simple, and destitute of a pneumatic duct.

This family has been subdivided into:—*Cyprinodontidæ carnivoræ*, having united mandibles and short intestines; and *C. limnophagæ*, having separated mandibles and long intestines.

Synopsis of Indian Genera.

Dorsal fin nearer head than anal .... 1. CYPRINODON.
Dorsal fin further from head than the elongate anal .. 2. HAPLOCHILUS.

1. Genus **CYPRINODON**, Lacépède.

Syn. *Lebias*, Cuvier; *Aphanius*, Nardo; *Micromugil*, Gulia.

Gape of mouth small; mandibles short and united at the symphysis. Teeth of moderate size, in a single compressed row, and notched at their summits. Origin of dorsal fin anterior to that of the anal, and largest in the male sex. Scales rather large. The colour of the sexes often different. Intestines of moderate length or rather short.

Geographical Distribution. Southern Europe, North Africa, Syria, Persia, along the shores of the Red Sea and Arabian Gulf to Cutch.

527. (1.) **Cyprinodon dispar.** (Fig. 134.)

Lebias dispar, *Rüppell, Atl. Fische*, p. 66, t. 18, fig. 1 (male), 2 (female).
Cyprinodon dispar, *Day, Fish. India*, p. 521, pl. cxxi, fig. 1 (male), 2 (female) (see synon.).

B. iii. D. 9. P. 17. V. 7. A. 10. C. 15. L. l. 25-27. L. tr. 8.

Length of head $3\frac{3}{4}$ to 4, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of the head, nearly 1 diam. from end of snout, and $1\frac{1}{2}$ apart. The maxilla does not reach to below the front edge of the eye. *Fins*—ventrals elongate in the males but not in the females. Caudal lunate. *Colour*—*Male*: greenish yellow reticulated darker, a small dark shoulder-spot. Dorsal fin spotted, anal more sparingly so. Caudal yellowish, with a wide crescentic black band, having a white edge

in its last half; another narrow black band between it and the root of the caudal which is also dark. *Female*: silvery, with from seven

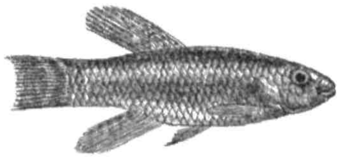

Fig. 134.—*Cyprinodon dispar*, male.

to nine narrow vertical bands. Ova very large, almost equalling the diameter of the eye.

Hab. Abyssinia, Palestine, shores of the Red Sea, and Arabian Gulf. Common in Cutch.

2. Genus **HAPLOCHILUS**, McClelland.

Syn. *Aplocheilus*, McClelland; *Panchax*, Cuv. & Val.; *Zygonectes*, Agassiz; *Micristius*, Gill.

Body somewhat elongate and compressed. Upper surface of head and nape broad and depressed. Mandibular bones united at the symphysis. Teeth villiform in the jaws, present or absent on the palate. Dorsal fin short, commencing behind the origin of the anal, which latter has an elongate base. Scales cycloid and of medium size. Lateral line absent. Intestinal canal of moderate length.

Geographical Distribution. India to the Malay Archipelago and beyond, Tropical Africa, Madagascar and Islands in the Indian Ocean, also temperate and tropical America. In India these fishes are mostly found in the neighbourhood of the sea or tidal rivers, more rarely very far inland*.

Synopsis of Indian Species.

A. 20-24. No prolonged ventral ray	1. *H. melastigma*, p. 415.
A prolonged ventral ray. Spotted with red..	2. *H. rubrostigma*, p. 416.
A prolonged ventral ray. Vertical black bands	3. *H. lineatus*, p. 416.
A. 15-17. No prolonged ventral ray	4. *H. panchax*, p. 417.

528. (1.) Haplochilus melanostigma.

Aplocheilus melastigmus, *McClelland, As. Res.* xix, *Ind. Cyp.* pp. 301, 427, pl. 42, fig. 3 (from *H. B. MSS.*).

Haplochilus melastigma, *Day, Fish. India*, p. 522, pl. cxxi, fig. 4 (see synon.).

* These fishes are termed *Kud-di-an* in Canarese; a white occipital spot is almost invariably present.

B. iv. D. 6–7. A. 20–24. C. 15. L. l. 27. L. tr. 9–11.

Length of head $4\frac{1}{4}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter 3 in length of head, 1 diam. from end of snout and also apart. *Teeth*—minute, none on the palate. *Fins*—ventral small, without any prolonged ray. Anal with in some (not all) examples its rays prolonged in a filiform manner beyond the membrane. Caudal rounded. *Colour*—dull green along the back, becoming dull white on the abdomen, outer portion of anal rays white-edged. A narrow dark line along the middle of the side, terminating in a dull spot at the centre of the base of the caudal fin.

Hab. Wynaad, and Madras Presidency, Orissa, Lower Bengal and Burma; attaining about $1\frac{1}{2}$ inches in length.

529. (2.) Haplochilus rubrostigma.

Aplocheilus rubrostigma, *Jerdon, Mad. Jour. L. S.* xv. 1849, p. 331.
Haplochilus rubrostigma, *Day, Fish. India*, p. 522, pl. cxxi, fig. 5 (see synon.).

B. v. D. 8. P. 15. V. 6. A. 17–18. C. 15. L. l. 33. L. tr. 9.

Length of head $4\frac{3}{4}$, height of body $5\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in the length of head, $1\frac{1}{4}$ diam. from end of snout, and $1\frac{1}{2}$ apart. *Teeth*—on vomer. *Fins*—ventral with its second ray elongate and reaching to the middle of the anal. Anal much lower in front and increasing in length to the last ray. Central caudal rays rather prolonged. *Colour*—a silver occipital spot. Body reddish brown above, becoming yellowish on the sides and beneath. Each scale along the side with a central red spot. A row, sometimes two, of red spots along the base of the anal fin, some on the dorsal, and a few dark spots on the caudal.

Hab. Malabar coast of India, and the lower portion of the Coromandel coast; attaining to at least 3 inches in length.

530. (3.) Haplochilus lineatus. (Fig. 135.)

Panchax lineatum, *Cuv. & Val. H. N. Poiss.* xviii, p. 381.
Haplochilus lineatus, *Day, Fish. India*, p. 522, pl. cxxi, fig. 6 (see synon.).

B. v–vi. D. 8–9. A. 15–17. C. 19. L. l. 32–34. L. tr. 9.

Length of head $4\frac{1}{4}$, height of body 5 to $5\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in the length of head, $1\frac{1}{3}$ diam. from end of snout, and $1\frac{1}{2}$ apart. *Teeth*—a single row across the palate. *Fins*—second ventral ray elongate, reaching to nearly the middle of the anal fin; anal high, the last rays about the same length as the first; central caudal rays rather prolonged. *Colour*—varying with the seasons and sex; greenish with a gloss of purple on the cheek and along the abdominal surface. A golden green spot in the

centre of each scale. Eight to ten vertical black bands pass down the sides to the abdomen. In a Ceylon specimen in the British

Fig. 135.—*Haplochilus lineatus.*

Museum there are dark blotches and not distinct bars as seen in Malabar examples.

Hab. This species is found in Coorg and the Wynaad, down the Malabar coast and in Ceylon. It attains 4 inches in length.

531. (4.) Haplochilus panchax.

Esox panchax, *Ham. Buch. Fish. Ganges*, pp. 211, 380, pl. iii, fig. 69.
Haplochilus panchax, *Day, Fish. India*, p. 523, pl. cxxi, fig. 3 (see synon.).

Pang-chax, Beng.; *Kanakuri* and *Bor-ro-guddi*, Ooriah; *Nga-saki*, Mugh; *Cho-to-dah*, Andamanese.

B. v–vi. D. 7–11. A. 15–17. C. 13. L. l. 31–34. L. tr. 9–10.

Length of head 4 to $4\frac{1}{3}$, height of body $4\frac{3}{4}$ to 5 in the total length. *Eyes*—diameter $3\frac{1}{3}$ in the length of head, 1 diam. from end of snout, and $1\frac{1}{2}$ apart. *Teeth*—in a broad band on the vomer. *Fins*—ventral small and without any elongated ray. Anal nearly square. Caudal rounded. *Colour*—a white occipital spot. Upper surface greenish, becoming dull white on the sides and beneath. Fins yellowish, lower third of dorsal covered with a large black spot. Dorsal, caudal, and anal margined with orange.

A variety exists on the Sind hills, and in Cutch, which has less scales (28) along the lateral line, numerous silvery spots along the sides, and a black spot behind the eye, the dorsal and anal fins are likewise more elongate.

Hab. From Orissa, through the lower province of Bengal, Burma, Siam to the Malay Archipelago, also the Andamans. (? Also Sind hills.) This species attains at least $3\frac{1}{2}$ inches in length.

Family XI. SCOMBRESOCIDÆ.

Syn. *Pharyngognathi malacopterygii*, Müller.

Pseudobranchiæ concealed, glandular. Margin of the upper jaw formed mesially by the premaxillaries, laterally by the maxillaries. Barbels present or absent. Lower pharyngeals united into a single

bone. Dorsal fin rayed, sometimes with finlets posterior to it, situated opposite the anal, and in the caudal portion of the vertebral column; no adipose dorsal. Scales present, frequently a keeled row along either side of the free portion of the tail. Air-bladder generally present, sometimes cellular, and destitute of a pneumatic duct. Stomach and intestines in one straight undivided tube. Pyloric appendages absent.

Geographical Distribution. Tropical and temperate seas, some of the species being resident in fresh water.

Synopsis of Indian Genera.

Both jaws elongated into a beak. No finlets .... 1. BELONE.
Upper jaw short, the lower elongated into a beak . 2. HEMIRHAMPHUS.
Jaws short; pectoral fins elongated into organs for flying .... 3. EXOCŒTUS.

1. Genus BELONE, Cuvier.

Syn. *Mastacembelus* (Klein), Bleeker; *Rhamphistoma,* Raf.; *Tylosurus,* Cocco; *Potamorrhaphis,* Günther.

Branchiostegals rather numerous. Gill-openings wide. Body elongate, subcylindrical or compressed. Eyes lateral. The jaws prolonged into a beak, the upper formed by the premaxillaries. Fine rugosities in both jaws, and a single row of long, widely-set, conical teeth; palate toothless in Indian species. The anterior dorsal rays vary in elevation, sometimes forming a lobe to the fin: no finlets; caudal usually forked. Scales small. Lateral line on free portion of tail, with or without a keel.

Uses. These Gar-fish are indifferent as food; their bones are green, as observed in the European forms.

In very young specimens the jaws are said not to be prolonged, and as age increases the mandibles are considerably advanced before the premaxillaries. Distinct varieties appear to be present in some species, as *Belone cancila,* some of the inland forms of which have an elevation along the back.

Synopsis of Indian Species.

A. Caudal forked.
A. 25–27 .... 1. *B. melanostigma,* p. 418.
A. 20–22. C. 15 .... 2. *B. annulata,* p. 419.
A. 19–20. C. 18 .... 3. *B. choram,* p. 419.
B. Caudal truncated or rounded.
D. 19. A. 22–24. Tail rounded........ 4. *B. liura,* p. 420.
D. 15–18. A. 16–18. Tail truncated.... 5. *B. cancila,* p. 420.
D. 13–15. A. 16–18. Tail rounded .... 6. *B. strongylura,* p. 421.

532. (1.) Belone melanostigma.

Belone melanostigma (*Ehrenb.*), *Cuv. & Val. H. N. Poiss.* xviii, p. 450; *Day, Fish. India,* p. 509 (see synon.).

B. xiii–xiv. D. 24–26. P. 14. V. 6. A. 25–27. C. 15.

Length of head $4\frac{1}{2}$, height of body 14 in the total length. *Eyes*—the diameter $2\frac{1}{2}$ in postorbital length of head. A wide median groove along the summit of the head; superciliary region slightly striated longitudinally. Tongue without asperities. *Fins*—the anterior dorsal rays from the second to the fourth produced; the anal commences rather in advance of the dorsal, and is of the same shape; caudal forked. Free portion of tail somewhat compressed. *Lateral line*—not forming a keel. *Scales*—minute. *Colour*—pectoral nearly black externally; from one to seven large black blotches along the side, which appear to be occasionally absent in females.

Hab. Red Sea to the Malay Archipelago: attaining at least $3\frac{1}{2}$ feet in length.

533. (2.) **Belone annulata.**

Belone annulata, *Cuv. & Val. H. N. Poiss.* xviii, p. 447, fig. 550; *Day, Fish. India*, p. 510, pl. cxx, fig. 1 (see synon.).

Pahmum kolah, Tamil; *Wahlah Kuddera*, Tel.

B. xii–xv. D. 22–24. P. 12–15. V. 6. A. 20–22. C. 15.

Length of head $3\frac{2}{3}$, height of body 13–20 in the total length. Width of body equals its height. *Eyes*—diameter $2\frac{1}{2}$ in postorbital length of head, $\frac{2}{3}$ diam. apart. Interorbital groove broad and shallow, striated along its anterior portion. *Teeth*—strong. Tongue covered with tubercular asperities. *Fins*—dorsal elevated in front, and its middle and last rays also rather elongate. Anal commences very slightly in advance of the dorsal, and is of somewhat similar shape. Caudal lobed, lower lobe the longer. *Scales*—thin and small, some present on the preopercle. Free portion of the tail tetrahedral, rather higher than broad. *Lateral line*—forming a badly-developed keel on the side of the free portion of the tail. *Colour*—upper surface of the head and back green, minutely dotted with black, fading into silvery white on the abdomen. The side of the upper jaw dark olive, of the lower silvery. Cheeks and opercles silvery. Membranes of dorsal, caudal, and pectoral fins light greenish grey, minutely dotted with black, especially at the margins. Anal and ventral white in front, dotted with black. In young specimens the colours vary.

Hab. Red Sea, seas and estuaries of India, Malay Archipelago, China, and North Australia. Grows to at least 2 feet in length.

534. (3.) **Belone choram.**

Esox belone, *Forsk. Descr. Anim.* p. 67.
Belone choram, *Rüppell, N. W., Fische*, p. 72; *Day, Fish. India*, p. 510, pl. cxviii, fig. 4 (see synon.).

B. x. D. 22–23. P. 14. V. 6. A. 19–20. C. 18.

Length of head $3\frac{1}{4}$ to $3\frac{1}{4}$, height of body 12 to 14 in the total

length. *Eyes*—diameter 2 in the postorbital length of the head, and from $1\frac{1}{4}$ to $1\frac{1}{2}$ diameters apart. A wide shallow groove exists along the summit of the head, superciliary region striated. *Fins*—dorsal rays longer in front, the hind rays reach nearly or quite the base of the caudal. Anal of the same character as the dorsal. Caudal forked, lower lobe the longer. Free portion of tail nearly as wide as high. *Scales*—absent from the opercles, some on groove on head. 25 rows between lateral line and base of dorsal fin. *Lateral line*—forming a narrow keel along the side of the free portion of the tail. *Colour*—bluish green above, becoming lighter below; a silvery stripe along the side; upper edge of dorsal and pectoral fins usually black.

Hab. From the Red Sea and East coast of Africa, through the seas of India to the Malay Archipelago; attaining at least $3\frac{1}{2}$ feet in length.

535. (4.) Belone liura.

Belone leiurus, *Bleeker, Batavia, Nat. Tijdsch.* i, p. 94; *Day, Fish. India*, p. 511 (see synon.).

Penlay-nga-toung-knyeen, Burmese.

B. x. D. 19. P. 11. V. 7. A. 22–24. C. 17.

Length of head 3 to $3\frac{1}{5}$, height of body 14 in the total length. *Eyes*—3 diameters in the postorbital length of the head, $1\frac{1}{4}$ apart. A wide shallow groove on the head, broadest in front. Superciliary and parietal regions striated. Tongue smooth. *Fins*—dorsal commences considerably behind the anal, its anterior rays the highest; upper surface of the fin concave. Anterior anal rays the longest; fin concave; its last ray, when laid flat, extends one third of distance to the base of the caudal, which is rounded. *Scales*—small over body and cheeks; 12 rows between the lateral line and base of the dorsal fin. Free portion of tail compressed, without any distinct lateral keel. *Colour*—bluish green, becoming light on the sides and beneath, with a silvery lateral band; the posterior half of the pectoral dark, as is also the lower half of the caudal fin.

Hab. Seas of India to the Malay Archipelago.

536. (5.) Belone cancila. (Fig. 136.)

Esox cancila, *Ham. Buch. Fish. Ganges*, pp. 213, 380, pl. 27, fig. 70.
Belone cancila, *Cuv. & Val. H. N. Poiss.* xviii, p. 455; *Day, Fish. India*, p. 511, pl. cxviii, fig. 5 (see synon.).

Kutra, Maráthi; *Gongituri*, Ooriah; *Kung-gah, Cowa, Sona*, and *Kuhaan*, Punj.: *Nga-oh-poung-yoh* and *Nga-phon-yo*, Burmese; *Pissu kolah*, Tam.; *Ko-ki-lah*, Assam.

B. x. D. 15–18. P. 11. V. 6. A. 16–18. C. 15.

Length of head $2\frac{2}{3}$ to $2\frac{3}{4}$, height of body 8 to 12 in the total length. *Eyes*—3 to $3\frac{1}{6}$ diameters from the hind edge of the opercle, and 1 apart. A deep longitudinal groove along the upper

surface of the head. Supraorbital margin smooth. *Fins*—dorsal commences opposite the anal. Caudal slightly emarginate. The last dorsal and anal rays not elongate. *Scales*—small over the body and in irregular rows, some over front end of groove on head, also on sides of head except on opercles. Free portion of the tail compressed. *Colour*—greenish grey above, becoming whitish along the abdomen; a silvery streak having a dark margin extends

Fig. 136.—*Belone cancila.*

along the body from opposite the orbit to the centre of base of caudal fin. The whole upper two thirds of the body closely marked with fine black spots; along the side between the pectoral and anal fins there are 4 or 5 larger blotches, these are absent in the young. Eyes golden.

There is a variety at Hardwar and in the Central Provinces, having a hump along the first part of its back, sometimes continued as an elevated ridge as far as the origin of the dorsal fin.

Hab. Fresh waters of Sind, India, and Ceylon, also throughout Burma; attaining at least 12 inches in length.

537. (6.) Belone strongylura.

Belone strongylura, *V. Hasselt, Alg. Konst. en Letterb.* 1823, p. 131; *Day, Fish. India*, p. 512, pl. cxviii, fig. 6 (see synon.).

Cungur, Sind.; *Ooshee-collarchee* and *Coco-meen*, "Long-nosed fish," Tam.; *Wodlah-muku* and *Kuddera*, Tel.; *Thook-o-doo-noo-dah*, Andam.; *Coplah*, Mal.; *Tol*, Maráthi; *Nga-toung-pnié-goung-khyoung*, Arracan; *Burra toonchia*, Chittagong; *Nga-p'houng-yo*, Burmese.

B. xii. D. 13–15. P. 11. V. 6. A. 16–18. C. 15.

Length of head $2\frac{2}{3}$ to 3, height of body 13 to 14 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in postorbital length of head, 1 to $1\frac{1}{4}$ apart. A shallow median groove along the head, the superciliary region scarcely striated. *Fins*—first 4 rays of anal in advance of the dorsal, which is highest in front, with the upper margin concave, its posterior rays do not extend nearly to the root of the caudal fin; anal of the same shape. Caudal rounded. *Scales*—small, on the opercles and groove on the head; 11 transverse rows between lateral line and anterior rays of dorsal fin. *Lateral line*—double. The free portion of the tail much compressed. *Colour*—summit of head and back yellowish green, with minute brown dots, fading into silvery on the sides, and white on the abdomen. A deep blue longitudinal band, bordered beneath by another broader one of silver, along the posterior half of the sides. Caudal yel-

lowish or greenish, minutely dotted with black, and having a round bluish-black spot in the centre near the root.

Hab. Seas and coasts of India and Burma to the Malay Archipelago. Sometimes taken in estuaries and tidal rivers: not uncommon at Calcutta. This fish attains 2 feet or more in length.

2. Genus HEMIRHAMPHUS, Cuv.

Syn. *Hyporhamphus*, *Euleptorhamphus*, *Zenarchopterus*, and *Oxyporhamphus*, Gill; *Dermatogenys* (K. & v. Hass.), Peters; *Hemirhamphodon*, Bleeker; *Arhamphus*, Günther.

Parl kollarchee, Tamil; *Toli*, Maráthi.

Branchiostegals rather numerous. Gill-openings wide. Body subcylindrical and elongate. Eyes lateral. Upper jaw, formed by the premaxillaries, short and more or less triangular in form; the lower jaw, *in the adult*, is elongated far beyond the upper. A nasal barbel usually present. Teeth villiform in both jaws. No finlets posterior to the dorsal fin. Caudal mostly forked or emarginate, sometimes rounded. Scales of moderate, or large, size. Air-bladder large, occasionally cellular. Some species are viviparous. No pyloric appendages.

During the cold season of the year the roes of these fishes are largely collected and salted on the Malabar coast of India, where they are esteemed a great delicacy.

The scales of species of *Hemirhamphi* and *Exocœti* are counted in a straight line between the head and base of the caudal fin and not along the lateral line, consequently the letters L. r. or lateral rows are employed.

Synopsis of Indian Species.

A. Pectorals thrice as long as caudal fin.... 1. *H. longirostris*, p. 423.
B. Pectorals short.
- *a.* Tail forked.
  - *a'.* Ventrals arising much nearer to caudal than to pectorals.
    - *a''.* No scales on anal fin. D. 18 (16), A. 15 (14) .... 2. *H. leucopterus*, p. 423.
    - *b''.* Some scales on anal. D. 15–16, A. 15........................ 3. *H. cantori*, p. 423.
    - *c''.* No scales on anal or dorsal. D. 14–15, A. 13–14............ 4. *H. georgii*, p. 424.
    - *d''.* A few scales on anal and dorsal. D. 13–14, A. 10–12........... 5. *H. far*, p. 424.
  - *b'.* Ventrals arising about halfway between base of caudal and pectorals. 6. *H. reynaldi*, p. 425.
  - *c'.* Ventrals arising about halfway between base of caudal and eye.
    - *a''.* Beak red-tipped .... 7. *H. xanthopterus*, [p. 425.
    - *b''.* Beak uniformly coloured.
      - *a'''.* Scales on anal and dorsal .... 8. *H. unifasciatus*, p. 426.
      - *b'''.* No scales on anal or dorsal .. 9. *H. limbatus*, p. 426.

b. Tail square or rounded, not forked.
  a'. Dorsal arising nearer head than anal.
    a''. Some rays in middle of anal elongate .... 10. *H. dispar*, p. 426.
    b''. No anal rays produced.
      a'''. Beak beyond upper jaw $\frac{2}{7}$ of total length................ 11. *H. buffonis*, p. 427.
      b'''. Beak about $\frac{3}{11}$ of total ...... 12. *H. ectuntio*, p. 427.
  b'. Anal arising nearer head than dorsal. 13. *H. brachynotopterus*, [p. 428.

538. (1.) **Hemirhamphus longirostris.**

Hemirhamphus longirostris, *Cuv. Règ. Anim. éd. nouv.* 1829, ii, p. 286; *Cuv. & Val. H. N. Poiss.* xix, p. 52; *Day, Fish. India*, p. 513 (see synon.).

D. 21–22. P. 8. V. 6. A. 18–20. C. 26.

Length of head 3, of beak $4\frac{1}{2}$, of caudal fin $10\frac{1}{2}$, height of body 18 in the total length. *Eyes*—diameter $1\frac{1}{3}$ in postorbital length of head, and nearly 1 apart. Body narrow and compressed. Upper jaw convex in both directions and one fourth wider at its base than it is long. *Fins*—dorsal much elevated in front, it commences somewhat in advance of the origin of the anal. Pectoral $3\frac{3}{5}$ in the length of the body, its upper ray broad and compressed. Ventrals very small, one sixth the length of the pectoral. Caudal deeply forked, lower lobe the longer. *Colour*—a silvery lateral band, the fins with dark outer margins.

Hab. Coromandel coast of India; attaining at least 10·5 inches in length: Leschenault refers to this species individuals up to 3 feet.

539. (2.) **Hemirhamphus leucopterus.**

Hemirhamphus leucopterus, *Cuv. & Val. H. N. Poiss.* xix, p. 48; *Day, Fish. India*, p. 514.

D. 18 (16). P. 11. V. 6. A. 15 (14). C. 14.

Length of head $2\frac{1}{2}$, of beak $4\frac{1}{2}$, height of body 12 in the total length. *Eyes*—diameter $1\frac{1}{3}$ in postorbital length of head, $1\frac{1}{4}$ apart. Upper jaw slightly wider at its base than it is long, keeled, not scaled; no barbels. *Fins*—anal commences under the third dorsal ray. Ventral inserted in commencement of last third of distance between eye and base of caudal fin. Lower lobe of caudal the longer. *Scales*—none on dorsal or anal fins. *Colour*—a silvery lateral band; fins colourless; beak black.

Hab. Bombay; growing to 6 inches or more in length.

540. (3.) **Hemirhamphus cantori.** (Fig. 137.)

Hemirhamphus cantori, *Bleeker, Nederland. Tijds. Dierk.* iii, p. 145; *Day, Fish. India*, p. 514, pl. cxix, fig. 1 (see synon.).

B. xiv. D. 15–16. P. 10–12. V. 6. A. 15. C. 16. L. l. 62.

Length of head $2\frac{1}{3}$, of beak $3\frac{2}{3}$, height of body 12 to 13 in the total length. *Eyes*—diameter $1\frac{2}{3}$ in postorbital length of head and $1\frac{1}{3}$ apart. Body compressed. Upper jaw pointed, one third longer than wide and rather convex. *Fins*—dorsal fin commences before the anal. Ventral inserted in commencement of last third

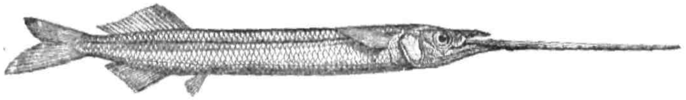

Fig. 137.—*Hemirhamphus cantori.*

of distance between front end or middle of premaxillaries and base of caudal fin, which is forked, its lower lobe the longer. *Scales*—none on dorsal fin but some on anal; 6 rows between lateral line and base of dorsal fin. *Colour*—greenish blue above, having a burnished silvery stripe along each side.

Hab. Bombay, Malabar, Madras, and seas of India to the Malay Archipelago and China.

541. (4.) Hemirhamphus georgii.

Hemirhamphus georgii, *Cuv. & Val. H. N. Poiss.* xix, p. 37, pl. 555; *Day, Fish. India*, p. 515, pl. cxx, fig. 2 (see synon.).

B. xii. D. 14–15 (16–17). A. 13–14. C. 16. L. l. 54–58.

Length of head $2\frac{3}{4}$, of beak $4\frac{2}{3}$ to 5, height of body 10 to 13 in the total length. *Eyes*—diameter $1\frac{1}{2}$ to $1\frac{2}{3}$ in postorbital length of head, $1\frac{1}{4}$ apart. Upper jaw about one diameter of eye in length, rather pointed and a little longer than wide at its base, convex, scarcely keeled and not scaled. *Fins*—dorsal commences in last fourth of distance between front edge of eye and base of caudal and a little in front of the anal. Ventral inserted in commencement of last third of distance between angle of mouth and base of caudal fin. Length of base of anal two thirds that of dorsal. Caudal deeply forked. *Scales*—none on dorsal or anal fins; 5 rows between lateral line and base of dorsal. *Colour*—a broad silvery stripe rather wider than a scale. Fringe on lower jaw black.

Hab. Seas of India to the Malay Archipelago.

542. (5.) Hemirhamphus far.

Esox far, *Forsk. Descr. Anim.* p. 67, no. 98 *b*.
Hemirhamphus far, *Day, Fish. India*, p. 516, pl. cxx, fig. 3 (see synon.).

B. xii–xiv. D. 13–14. A. 10–12. C. 15. L. l. 50–54. Vert. 38/16.

Length of head $2\frac{3}{4}$ to 3, of beak 5 to $5\frac{4}{5}$, height of body $8\frac{1}{2}$ to 12 in the total length. *Eyes*—diameter $1\frac{1}{2}$ in postorbital length

of head, 1 apart. Greatest width of body one half to two thirds of its height. Triangular portion of upper jaw much wider than long. *Fins*—dorsal commences considerably in advance of anal. Ventral inserted in last third of distance between middle of eye and base of caudal. Anal about one half as long as dorsal. Caudal deeply forked, lower lobe the longer. *Scales*—a few on front portion of dorsal and anal fins. *Colour*—back dark bluish green: a silvery lateral band, and four dark blotches or spots along the sides.

Hab. Red Sea and east coast of Africa, through the seas of India to the Malay Archipelago and beyond; said to attain over 18 inches in length.

543. (6.) Hemirhamphus reynaldi.

Hemirhamphus reynaldi, *Cuv. & Val. H. N. Poiss.* xix, p. 39; *Day, Fish. India*, p. 515 (see synon.).

B. xiii–xiv. D. 14–15 (16). A. 14–15 (17). C. 15. L. l. 52–54.

Length of head $3\frac{1}{5}$, of beak $6\frac{1}{3}$, height of body 11 to 13 in the total length. *Eyes*—diameter equals postorbital length of head, and also width of interorbital space. Upper jaw keeled, scaled, rather broader at its base than it is long. No barbels. Body nearly as wide as high. *Fins*—anal commences below the third or fourth dorsal ray. Ventral commences rather nearer to the base of the caudal than to that of the pectoral, or else midway. Caudal deeply forked, lower lobe the longer. *Scales*—none on dorsal or anal fins. *Colour*—a silvery lateral band; upper edge of dorsal blackish.

Hab. East coast of Africa, seas of India and of Malay Archipelago; growing to 9 inches or more in length.

544. (7.) Hemirhamphus xanthopterus.

Hemirhamphus xanthopterus, *Cuv. & Val. H. N. Poiss.* xix, p. 47 *Day, Fish. India*, p. 514, pl. cxix, fig. 2.

B. xii. D. 14–15. P. 13. V. 6. A. 16–17. C. 15. L. r. 56–58.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, of beak 7 to $7\frac{1}{2}$, height of body 12 in the total length. *Eyes*—diameter $1\frac{1}{3}$ in postorbital length of head, and $\frac{3}{4}$ to 1 apart. Upper jaw rather longer than wide at its base. No barbels. *Fins*—anal commences opposite dorsal, the anterior portion of both rather elevated. Ventral inserted midway between hind edge of the eye and base of caudal. Lower caudal lobe the longer. *Scales*—none on dorsal or anal fins, or a few very fine ones on their anterior portion; 7 rows between lateral line and base of dorsal fin. *Colour*—a brilliant lateral band two thirds as wide as a scale in its widest part. End of beak coral-red.

Hab. Malabar coast of India, growing to 6 inches at least in length.

545. (8.) Hemirhamphus unifasciatus.

Hemirhamphus unifasciatus, *Ranzani, Nov. Comm. Acad. Sc. Inst. Bonon.* v, 1842, p. 326, t. 25; *Day, Fish. India*, p. 514 (see synon.).

B. x. D. 15–16. P. 12. V. 6. A. 15–17. C. 16. L. l. 52–58.

Length of head $3\frac{1}{4}$, of beak $6\frac{3}{4}$, height of body $11\frac{1}{2}$ in the total length. *Eyes*—diameter $1\frac{1}{2}$ in postorbital length of head, and $1\frac{1}{4}$ apart. *Fins*—dorsal commences in last fourth of distance between angle of mouth and base of caudal. Ventral inserted midway between base of caudal and front edge of eye. Caudal forked, lower lobe the longer. *Scales*—present on dorsal and anal fins; $5\frac{1}{2}$ to 6 rows between base of dorsal and lateral line. *Colour*—bluish, with a rather narrow silvery band.

Hab. Malabar, Andamans, to the Malay Archipelago and beyond; attaining to 8 inches or more in length.

546. (9.) Hemirhamphus limbatus.

Hemirhamphus limbatus, *Cuv. & Val. H. N. Poiss.* xix, p. 44; *Day, Fish. India*, p. 516, pl. cxix, fig. 3 (see synon.).

Gongaturi, Ooriah.

B. x. D. 13–14. P. 10. V. 6. A. 13–15. C. 14. L. l. 50–52.

Length of head $3\frac{1}{3}$ to $3\frac{1}{4}$, of beak $6\frac{1}{3}$ to $6\frac{1}{2}$, height of body 9 to 10 in the total length. *Eyes*—diameter $1\frac{1}{3}$ to $1\frac{2}{3}$ in postorbital portion of head, nearly 1 apart. Width of body $\frac{2}{3}$ of its height. Upper jaw short, one half wider at its base than it is long, and keeled along mesial line. *Fins*—dorsal commences very slightly in advance of anal, both fins having their outer edges concave. Ventral inserted about midway between eye and base of caudal. Anal slightly shorter than dorsal. Caudal lobed, the lower the longer. *Scales*—5 rows between base of dorsal and lateral line. None on dorsal or anal, or a few on their front portions. *Colour*—a brilliant silvery lateral band, which behind becomes as broad as one scale. Dorsal, anal, and extremity of caudal sometimes stained blackish.

Hab. This is by far the most common species off the Coromandel coast of India, and extends to Burma; it is also found, but more rarely, on the Malabar coast. It ascends tidal rivers, and may be captured in fresh waters; it attains at least 7 inches in length.

547. (10.) Hemirhamphus dispar.

Hemirhamphus dispar, *Cuv. & Val. H. N. Poiss.* xix, p. 58, pl. 558; *Day, Fish. India*, p. 517, pl. cxix, fig. 5 (see synon.).

B. x–xi. D. 11–12. P. 10. V. 6. A. 11–12. C. 15. L. l. 40.

Length of entire head $2\frac{1}{3}$ to $2\frac{1}{2}$, of beak $4\frac{1}{4}$, height of body 11 in the total length. *Eyes*—diameter $1\frac{1}{3}$ in postorbital length of head, and $1\frac{2}{3}$ apart. Upper jaw as broad at its base as it is long. A nasal barbel two thirds as long as the eye. *Fins*—dorsal commences about 3 rays in front of the anal, one of its rays may be

modified. Ventral inserted in commencement of last third of distance between end of upper jaw and base of caudal fin. Anal with some of its rays, especially the sixth and sometimes the seventh, much thickened and elongate. Caudal cut square or slightly rounded. *Scales*—none on dorsal or anal fins; present on upper jaw. *Colour*—a silvery band along the side.

Hab. Seas of India to the Malay Archipelago and beyond. Common at the Andamans in protected bays.

548. (11.) Hemirhamphus buffonis.

Hemirhamphus buffonis, *Cuv. & Val. H. N. Poiss.* xix, p. 48; *Day, Fish. India*, p. 516, pl. cxix, fig. 4 (see synon.).

Koo-door-rock-o-dah, Andamanese.

B. xi. D. 14. P. 10. V. 6. A. 10–12. C. 13. L. r. 42.

Length of head $2\frac{1}{5}$ to $2\frac{1}{2}$, of beak $3\frac{1}{5}$ to $3\frac{1}{2}$, height of body $8\frac{1}{2}$ to 9 in the total length. *Eyes*—diameter $1\frac{1}{2}$ in postorbital extent of head, $1\frac{1}{4}$ apart. Upper jaw one fourth wider at its base than it is long. A barbel at posterior nostril one half length of eye. *Fins*—dorsal with a rather oblique upper edge. Ventral small, inserted in commencement of last third of distance between eye and base of caudal fin. Anal commences under the third or fourth dorsal ray, and the length of its base is from one half to one third as long; some of its rays are sometimes thickened. Caudal rounded, its lower rays very slightly produced. *Scales*—on upper jaw, none on the vertical fins. *Colour*—a narrow silvery streak along the side; upper half of dorsal black.

Hab. Bombay, Hooghly, Andamans, waters of the Malay Archipelago and perhaps China. This fish ascends tidal rivers for some distance. It attains at least 8 or 9 inches in length.

549. (12.) Hemirhamphus ectuntio.

Esox ectuntio, *Ham. Buch. Fish. Ganges*, pp. 212, 380.
Hemirhamphus ectunctio, *Day, Fish. India*, p. 517, pl. cxix, fig. 6 (see synon.).

Nya-poung-nyo, Burmese; *Gongieturi*, Ooriah.

B. x. D. 13–14. P. 9. V. 6. A. 10–12. C. 15. L. l. 46–48.

Length of head $2\frac{1}{2}$ to $2\frac{3}{4}$, of beak $5\frac{1}{2}$, height of body 11 in the total length. *Eyes*—$2\frac{1}{4}$ to $2\frac{1}{2}$ diameters in postorbital length of head, and $1\frac{1}{4}$ apart. Head and body compressed. Upper jaw twice as long as broad at its base. Upper surface of the head flat. A short barbel, which is sometimes absent, at the nostril. *Fins*—the dorsal commences somewhat in advance of the anal. Ventral inserted in commencement of last third of distance between eye and base of caudal. Anal rays thickened in the male. Caudal rounded. *Scales*—on upper jaw, none on vertical fins. *Colour*—dull greenish brown, with a narrow and indistinct lateral band; end of upper jaw milk-white.

It is curious to observe these fish in tidal rivers, they swim near the surface, with their milk-white upper jaw generally visible.

Hab. Hooghly, tidal stream at Akyab, Burma, Siam, and the Malay Archipelago; attaining at least 6 inches in length.

550. (13.) **Hemirhamphus brachynotopterus.**

Hemirhamphus brachynotopterus, *Bleeker, Batav. Genootsch. Verhand.* xxv. *Beng. en Hind.* p. 146; *Day, Fish. India,* p. 517 (see synon.).

D. 9. A. 15. C. 16.

Length of head $3\frac{1}{4}$, of beak $4\frac{2}{3}$, height of body 12 in the total length. *Eyes*—2 diameters in postorbital length of head, rather above 1 apart. Body elongate and compressed, a little higher than wide. Upper jaw rather wider than long. Upper surface of head flat. *Fins*—first ray of the dorsal over the fifth of the anal, length of the base of the anal not quite twice as long as that of the dorsal. Anal not lower than the body, its inferior edge concave. Caudal rounded.

Hab. River Hooghly, whence Dr. Bleeker received a single small specimen, which unfortunately is now in a bad state.

3. Genus **EXOCŒTUS**, Artedi.

Syn. *Cypsilurus,* Swains.; *Halocypselus,* Weinland; *Parexocœtus,* Bleeker.

Body moderately oblong. Gill-openings very wide. Jaws short; the premaxillaries and maxillaries separate. Mandible in some species with a tubercular prolongation. Barbels present or absent. Teeth, when present, minute and rudimentary. Pectorals elongate, used as an organ for flying. Air-bladder large. Pyloric appendages absent.

As many species of flying-fish are only known from young specimens, the size of the eye and the length of the fins as given in descriptions must be accepted with reservation. Barbels in some species may be an indication that the fish is immature, so may vertical bands on the body.

Geographical Distribution. Seas of temperate and tropical regions.

Synopsis of Indian Species.

A. Ventrals short, not nearly reaching anal.
  a. Ventrals inserted nearer to tail than to head .... 1. *E. micropterus,* p. 429.
  b. Ventrals inserted nearer to head than to tail .... 2. *E. evolans,* p. 429.
B. Ventrals long, reaching to root of caudal. 3. *E. furcatus,* p. 429.
C. Ventrals reaching middle or end of base of anal, but not to caudal.
  a. Pectorals spotted black .... 4. *E. pœcilopterus,* p. 430.

b. Pectorals blackish, with an oblique white band .... 5. *E. altipinnis*, p. 430.
c. Pectorals neither spotted nor banded .. 6. *E. bahiensis*, p. 431.
D. Ventrals only just reaching or not quite reaching anal .... 7. *E. mento*, p. 431.

551. (1.) Exocœtus micropterus.

Exocœtus micropterus, *Cuv. & Val. H. N. Poiss.* xix, p. 127, pl. 563; *Day, Fish. India*, p. 518 (see synon.).

B. xiii. D. 15–16. P. 11–12. V. 6. A. 14–15. C. 15. L. l. 50.

Length of head $5\frac{1}{2}$, height of body $7\frac{1}{2}$ in the total length. *Eyes*—$3\frac{2}{3}$ diameters in length of head, nearly 1 from end of snout. A pair of short barbels under symphysis of lower jaw, which is prominent. *Fins*—dorsal commences a little anteriorly to anal, and in the last fourth of the body, the highest dorsal rays scarcely exceed $1\frac{1}{2}$ diameters of orbit; upper edge of fin rather convex. Pectoral not reaching so far as to the ventral, the latter, which is inserted midway between pectoral and caudal, not extending to anal. Anal of same shape as dorsal. Lower caudal lobe the longer. *Colour*—bluish above; silvery on the sides and beneath; fins dark.

Hab. Malabar to the Malay Archipelago.

552. (2.) Exocœtus evolans.

Exocœtus evolans, *Linn. Syst. Nat.* i, p. 521; *Day, Fish. India*, p. 519, pl. cxx, fig. 5 (see synon.).

D. 12–14. P. 14. V. 6. A. 13–15. C. 17. L. l. 40–42. Vert. 25/19.

Length of head 5, height of body 6 in the total length. *Eyes*—$3\frac{1}{2}$ diameters in length of head, $\frac{3}{4}$ from end of snout, and 1 apart. *Fins*—dorsal arises above or slightly in advance of origin of anal. Pectoral reaches to base of caudal. Ventral short, reaching half-way to base of anal. Caudal lobed, the lower lobe much the longer. *Scales*—$6\frac{1}{2}$ rows between origin of dorsal and lateral line. *Colour*—bluish along the back, becoming lighter on the sides and beneath. Pectoral grey or black, and with a light edge.

Hab. Indian and other tropical and subtropical seas; attaining at least 9 inches in length.

553. (3.) Exocœtus furcatus.

Exocœtus furcatus, *Mitchell, Lit. and Phil. Trans. New York*, i, p. 449, pl. v, fig. 2; *Day, Fish. India*, p. 519 (see synon.).

D. 13. P. 13. V. 6. A. 9–10.

A pair of barbels at symphysis of lower jaw. *Fins*—dorsal moderately high, but its longest rays do not extend to caudal. Ventrals reach root of caudal, and pectorals nearly as far; the former arise slightly nearer to base of caudal than to snout. *Colour*—posterior part of ventrals and lower part of anal black. *Young* with three broad vertical bands across the anterior half of

Eighth group. COTTO-SCOMBRIFORMES.

Dorsal fins placed close together or continuous, having fewer spines than rays, or the spinous portion may be modified into tentacles, detached spines, or a suctorial disk; anal similar to the soft dorsal, sometimes both fins are modified posteriorly into finlets; ventrals, when present, jugular or thoracic, never forming a sucker. No prominent anal papilla.

XVI. A single dorsal fin, with fewer spines than rays. One or more bony spines on either side of the tail in the adult .... **Acanthuridæ.**

XVII. Body more or less compressed. Teeth, when present, villiform or conical. Spinous portion of the dorsal sometimes rudimentary; the posterior rays of the dorsal and anal may consist of detached finlets; ventrals, when present, thoracic. Vertebræ 10/14 (*Naucrates* 10/16). **Carangidæ.**

XVIII. Body oblong and compressed. Dentition feeble. Barbed teeth extend into the œsophagus. One long dorsal fin without any distinct spinous portion. Vertebræ exceed 10/14.................................. **Stromateidæ.**

XIX. Body compressed. No teeth in the œsophagus. One long dorsal fin without any distinct spinous portion. Vertebræ exceed 10/14.................................. **Coryphænidæ.**

XX. Body oblong or slightly elongate, scarcely compressed. Two dorsal fins, the first being sometimes modified into free spines, or an adhesive disk, whilst the posterior dorsal and anal rays may be in the form of finlets. Scales, if present, small .... **Scombridæ.**

XXI. One or two dorsal fins, the spinous portion less developed than the soft, which is similar to the anal. Eyes on the upper surface of head .... **Uranoscopidæ.**

XXII. Body low and more or less elongate. One or two dorsal fins. Vertebræ exceed 10/14.................................. **Trachinidæ.**

XXIII. Preopercle articulated with the orbit. Dorsal fin single. Lateral line incomplete or interrupted .... **Pseudochromides.**

XXIV. Body low and more or less elongate. First dorsal fin consisting of a few free spines; ventrals jugular, 1/2 .... **Batrachidæ.**

XXV. The spinous dorsal, when present, composed of a few isolated spines which may be modified into tentacles; carpal bones forming a sort of arm for the pectoral fin; ventrals, when present, jugular, having four or five rays .... **Pediculati.**

XXVI. Preopercle articulated with the orbit by a bony process from the supraorbital ring. Body more or less elongate. Pectoral fins with or without filamentous appendages; ventrals thoracic. Body scaleless, scaled, or with a single row of plate-like scales ...... **Cottidæ.**

XXVII. Preopercle articulated with the orbit. Head and body more or less angular, cuirassed with plates, or keeled scales covering the body .... **Cataphracti.**

Ninth group. GOBIIFORMES.

Spinous dorsal short and composed of flexible spines, the soft dorsal and anal being of equal extent; ventrals, when present, thoracic or jugular, having 1/5 or 1/4. A prominent anal papilla.

XXVIII. Ventrals either united so as to form a disk or else placed close together; anal spines may be present .... **Gobiidæ.**

XXIX. Two dorsal fins, the first with from four to six flexible spines; ventrals wide apart .. **Callionymidæ.**

Tenth group. BLENNIIFORMES.

Body elongate and more or less cylindrical. Spinous portion of dorsal fin, when distinct, may be as fully developed as the soft part, or even more so; anal more or less elongate; ventrals, if present, thoracic or jugular; caudal, when present, sometimes subtruncated or rounded.

XXX. Ventral fins, when present, jugular; anal spines few, or absent. Often a prominent anal papilla .... **Blenniidæ.**

XXXI. Ventrals jugular. One or two spineless dorsal fins; no anal spines; no anal papilla.. **Trichonotidæ.**

XXXII. Ventrals thoracic, with one spine and 5 rays. Body elongate and band-like. A single long dorsal and anal fin, both of soft rays .... **Cepolidæ.**

XXXIII. Body eel-like. Anterior portion of the dorsal fin consisting of numerous free spines; ventrals absent. No prominent anal papilla.. **Rhynchobdellidæ.**

Eleventh group. MUGILIFORMES.

Two distinct dorsal fins, the anterior short or similar to the posterior; ventrals well developed, abdominal, 1/5.

XXXIV. Body elongate, subcylindrical. Teeth large and cutting. Lateral line continuous. Vertebræ 24 .... **Sphyrænidæ.**

XXXV. Body more or less elongate and somewhat subcylindrical. Lateral line indistinct. Dentition feeble or moderate. Vertebræ usually exceeding 10/14 .... **Atherinidæ.**

XXXVI. Body more or less elongate and somewhat subcylindrical. No lateral line. Dentition feeble. First dorsal consisting of four stiff spines. Vertebræ 24 .... **Mugilidæ.**

Twelfth group. GASTEROSTEIFORMES.

The spinous dorsal, when present, short or formed of isolated spines; ventrals abdominal, sometimes imperfectly developed.

XXXVII. Anterior bones of the head forming a tube having a small mouth at its extremity. Ventrals with 6 rays .... **Aulostomateidæ.**
XXXVIII. Anterior bones of the head forming a tube having a small mouth at its extremity. Ventrals imperfectly developed .... **Centriscidæ.**

Thirteenth group. CHANNIFORMES.

Body elongate. No labyrinthiform superbranchial organ, but a prominence on the epitympanic bone. Dorsal and anal fins long, all destitute of spines.

XXXIX. .... **Ophiocephalidæ.**

Fourteenth group. LABYRINTHIBRANCHII.

Body compressed, oblong or elevated. A labyrinthiform superbranchial organ arising from the branchial arches, and employed for respiratory purposes.

XL. .... **Labyrinthici.**

Fifteenth group. TRACHYPTERIFORMES.

Body elongate and strongly compressed. Skeleton soft. Dentition feeble. Anal fin absent; caudal not in the longitudinal axis of the fish or else rudimentary; ventrals thoracic.

XLI. .... **Trachypteridæ.**

Sixteenth group. LABRIFORMES.

The lower pharyngeal bones coalesced along the median line, and with or without a median longitudinal suture. A single dorsal fin, the number of spines and rays being nearly equal; soft anal similar to the soft dorsal; ventrals 1/5, thoracic.

XLII. Pseudobranchiæ present; scales ctenoid.. **Glyphidodontidæ.**
XLIII. Pseudobranchiæ present; scales cycloid.. **Labridæ.**
XLIV. Pseudobranchiæ absent .... **Chromides.**

Family I. PERCIDÆ.

Pseudobranchiæ present. Body generally oblong, never elongate. Muciferous system of head rudimentary, or but slightly developed. Eyes lateral. No superbranchial organ. Preopercle entire or serrated; cheeks not cuirassed. Mouth moderately or

in some cases very protractile. Teeth present or absent on the vomer and palatines, in the jaws villiform, with or without canines. Anterior portion of the dorsal fin spinous; ventrals thoracic, with one spine and four soft rays, or sometimes 1/4. Scales ctenoid or cycloid. Lateral line, when present, continuous (except in some species of *Ambassis*). Air-bladder usually present and more or less simple. Pyloric appendages in varying numbers.

Geographical Distribution. World-wide, in seas and freshwater. The Indian Percidæ are almost entirely marine fishes. It is by no means uncommon to capture specimens of *Lates* long distances above salt water, but it is unusual to find any of the genera *Serranus*, *Lutjanus*, *Therapon*, *Pristipoma*, *Lobotes*, *Datnioides*, or *Gerres* many miles beyond tidal influence. The remainder of the genera are almost entirely marine, the most constant exception being species belonging to the genus *Ambassis*, in which, however, some are exclusively found in salt water; the majority are spread through the larger rivers and tanks of the plains.

The colours and tints of fishes vary in different waters; if, for instance, the water is opaque or muddy, its finny inhabitants will be found to be dark, whilst, on the other hand, in clear water they are brighter and generally lighter. Age and season likewise exercise an influence in this respect. In stuffed examples, or in those which have been long in spirit, marks become more or less obliterated. Irrespective of the foregoing, the period intervening between capture and examination has a considerable bearing upon fugitive colours, as well as whether the fishes have been sodden in water or kept dry by their captors; for instance, if a dark-coloured fish is placed in a dry situation, and any moist substance laid over it and kept wet, the portions of the body which have not been allowed to dry will be found to be of a lighter tint than those not so treated, and this appearance, which can be so easily produced, is indelible.

Synopsis of Indian Genera.

First group. PERCINA.

B. vii. Body oblong. Opercles strongly denticulated or armed. Cleft of mouth rather oblique. Two dorsal fins; three anal spines. Scales of moderate size, usually ctenoid. Pyloric appendages few. No canines.

Preorbital and preopercle serrated, the latter denticulated at its angle .... 1. LATES.

Second group. SERRANINA.

B. vii. Body oblong, sometimes elevated. Opercles serrated or armed. Cleft of mouth rather oblique. One or, more rarely, two dorsal fins. Villiform teeth on jaws, vomer, and palate.

Opercle armed. No canines. A single elevated dorsal fin; three anal spines .... 2. CROMILEPTES.

Opercle armed. Canines present. One dorsal fin; three anal spines. Caudal rounded, square

or emarginate. Scales small, cycloid or ctenoid .... 3. SERRANUS.

Opercle armed. Canines present; lateral conical teeth in lower jaw. One dorsal fin; three anal spines. Caudal deeply forked. Scales small, ctenoid .... 4. VARIOLA.

Opercle spiny. Two dorsal fins; no anal spines. Scales minute .... 5. GRAMMISTES.

Branchiostegals seven. Opercles armed. One dorsal fin; three anal spines. Scales of moderate size .... 6. MYRIODON.

Opercle armed; preopercle with a double denticulated edge. Two dorsal fins; two anal spines. Scales small, adherent .... 7. DIPLOPRION.

Opercle scarcely spiny; preopercle serrated, its vertical border in some species notched to receive an interopercular knob, which is sometimes present. Generally canines in both jaws, and an outer row of conical lateral teeth. One dorsal fin; three anal spines .... 8. LUTJANUS.

Third group. PRIACANTHINA.

B. vi. Lower jaw prominent. Cleft of mouth almost vertical. Scales ctenoid, small. Pyloric appendages few.

Eyes large .... 9. PRIACANTHUS.

Fourth group. APOGONINA.

Form of body more or less elevated and compressed. Opercles mostly denticulated or armed. Preopercle with a double border. Cleft of mouth oblique or even nearly vertical. Two dorsals. Scales deciduous.

B. vi. Opercle without a prominent spine. No canines. A recumbent spine anterior to the first dorsal fin; three anal spines. Scales of moderate or small size, deciduous.......... 10. AMBASSIS.

B. vii. Opercle with a spine. No canines. Two anal spines. Scales large, deciduous ...... 11. APOGON.

B. vii. Opercle without spine. Canines present. Two anal spines. Scales large, deciduous .. 12. CHILODIPTERUS.

Fifth group. GRYSTINA.

Body oblong or elevated. Opercles entire or variously serrated. Cleft of mouth more or less oblique. One dorsal.

B. vi. Preopercle serrated; opercle with spines. No canines. A single dorsal, deeply notched between the ninth and tenth spiues; three anal spines .... 13. DULES.

Sixth group. THERAPONINA.

B. vi. Opercle with spines; preopercle serrated. Cleft of mouth somewhat oblique. Dorsal fin single, but more or less notched; three anal spines. Air-bladder divided by a constriction into an anterior and posterior portion.

Teeth deciduous on vomer and palate, or absent from them. Dorsal with 12 or 13 spines.... 14. THERAPON.

Seventh group. PRISTIPOMATINA.

Preopercle serrated or entire. Mouth moderately protractile. Teeth in the jaws. Dorsal single; three anal spines. Air-bladder destitute of any constriction.

B. vii. Preopercle serrated. Mouth horizontal; a median groove along the under surface of the lower jaw .... 15. PRISTIPOMA.
B. vi–vii. Preopercle serrated; opercle with short points; barbel-like papillæ on the mandible. Villiform teeth in jaws, vomer, and palate, with an outer enlarged row in the former. Spinous dorsal low and deeply cleft; anal with three spines. Fins covered with fine scales .... 16. HAPALOGENYS.
B. vi–vii. Preopercle serrated. Mouth small; head very convex above; pores on under surface of lower jaw, but no median groove .... 17. DIAGRAMMA.
B. vi. Upper profile of the head concave. Preopercle serrated. Lower jaw the longer.... 18. LOBOTES.
B. v. Preopercle serrated. A backwardly-directed spine on the infraorbital ring of bones; opercle with a weak spine .... 19. SCOLOPSIS.
B. vi. Preorbital high. Preopercle entire. Generally strong canines. More than three rows of scales on the preopercle. Air-bladder notched posteriorly .... 20. DENTEX.
B. vi. Preorbital high. Preopercle serrated or entire. Canines not very strong, at least in the upper jaw. Three rows of scales on the preopercle .... 21. SYNAGRIS.
B. vi. Preorbital low. Preopercle entire. Generally strong canines. Three or more rows of scales on preopercle...................... 22. PENTAPUS.
B. vii. Preopercle entire. Canine teeth absent.. 23. APHAREUS.
B. vi. Preopercle entire. Vomer edentulous. Mouth protractile .... 24. SMARIS.
B. vi–vii. Preopercle entire or finely serrated. Palate edentulous .... 25. CÆSIO.
B. vii. Preopercle entire. Villiform teeth in jaws, vomer, and palate. Canines present. Scales of moderate size .... 26. APRION.

Eighth group. GERRINA.

B. vi. Body elevated or oblong. Preopercle serrated or entire. Mouth very protractile. No canines. A single dorsal. Air-bladder simple.

Preopercle serrated. A deeply notched dorsal fin; caudal rounded. Anal spines 3 .... 27. DATNIOIDES.
Preopercle mostly entire. Inferior pharyngeal bones generally united by a suture. Dorsal

fin with a scaly sheath. Caudal forked.
Anal spines 3 .... 28. GERRES.
Preopercle serrated along lower edge. Inferior pharyngeal bones not united by a suture. Dorsal with scaly sheath. Anal spines 5 .. 29. PENTAPRION.

First group. PERCINA.

1. Genus LATES, Cuv. & Val.

Syn. *Cnidon*, Müll. & Troschel; *Pseudates*, Alleyne & Macleay.

Brachiostegals seven. Body oblong and somewhat compressed. Preorbital and shoulder-bone serrated; preopercle with strong spines at its angle, and denticulated along its horizontal border; opercle spiny. Teeth villiform on jaws, vomer, and palatine bones; tongue smooth. Two dorsal fins united at their bases, the first with 7 or 8 spines, the anal with 3; caudal rounded. Scales finely ctenoid and of moderate size. Cæcal pylori few.

Geographical Distribution. Mouths of the Nile; the coasts of Baluchistan and Sind, and throughout the seas of India to the Malay Archipelago, China, and Australia; absent from the Red Sea. These fishes in India are marine forms, largely frequenting brackish water and occasionally ascending into fresh waters.

Uses. Excellent as food. The air-bladders or sounds are dried, and made into rough isinglass, much of which is exported from India to China, and some to Europe.

558. (1.) **Lates calcarifer** *. (Fig. 139.)

Holocentrus calcarifer, *Bloch, Ich.* t. 244.
Lates calcarifer, *Day, Fish. India*, p. 7, pl. i, fig. 1, *Suppl.* p. 779 (see synon.).

Dangara, Sind.; *Fitáda*, Maráthi; *Nuddee-meen* or *Nair-meen*, Mal.; *Painnee-meen* or *Koduwa*, Tam.; *Pandu kopah* or *Pandu menu*, Tel.; *Durruah* and *Bekkut*, Ooriah; *Begti*, Beng.; *Nga-tha-dyk*, Arracanese; *Nga-ka-kadyt*, Burmese; *Koral*, or if large *Baor*, Chittagong; *Todah*, Andam.; *Cock-up* of Europeans.

D. 7–8 | 1/10–12. P. 17. V. 1/5. A. 3/8–9. L. l. 52–60. L. tr. 6–7/13.

Length of head from $3\frac{2}{3}$ to 4, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—5 to 6 diameters in the length of head, 1 to $1\frac{1}{4}$ from end of snout, and $\frac{3}{4}$ apart. *Fins*—dorsal spines strong, the third the highest; third anal spine longest and strongest; pectoral shorter than ventral, and rounded. *Colour*—grey, with a dash of green along the back and silvery on the abdomen, during the monsoon with a tinge of purple. The immature are usually darker than adults.

* Whilst these pages were passing through the press, Mr. Boulenger called attention to two specimens of *Psammoperca waigiensis*, recently obtained at Madras. *P. waigiensis* is very similar to *L. calcarifer*, being chiefly distinguished by having the inferior margin of the preopercle entire, not toothed, and by the 2nd anal spine being nearly as long as the 3rd.

Hab. Seas, backwaters, and mouths of tidal rivers, from the coast east of the Persian Gulf to the Malay Archipelago and beyond. This fish is excellent eating when from the vicinity of large rivers. Large quantities are sold either fresh or partially

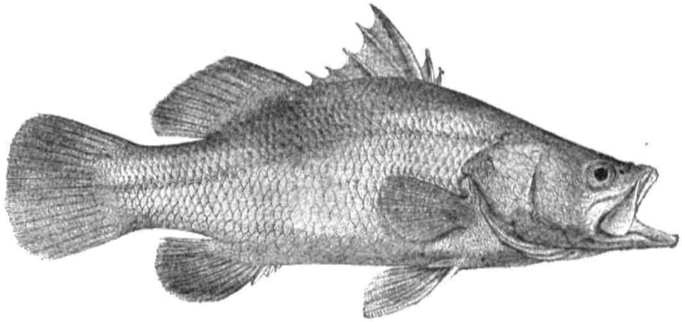

Fig. 139.—*Lates calcarifer.*

salted in the Calcutta markets. It has been recorded up to 5 feet in length and 200 lb. in weight.

Second group. SERRANINA.

2. Genus **CROMILEPTES**, Swains.

Syn. *Serranichthys*, Bleeker; *Lioperca*, Gill.

Branchiostegals seven. Body oblong, compressed. Eyes lateral, of moderate size. Preopercle with its vertical border finely serrated, its horizontal margin entire. Opercle with two or three spines. Teeth fine in the jaws, vomer, and palate; no canines; internal row in maxilla not fixed. Dorsal fin single, elevated, with 10 or 11 spines, anal with 3; caudal rounded. Scales small, cycloid.

559. (1.) **Cromileptes altivelis.** (Fig. 140.)

Serranus altivelis, *Cuv. & Val. H. N. Poiss.* ii, p. 324, pl. 35.
Cromileptes altivelis, *Day, Fish. India*, i, p. 9, pl. i, fig. 2, *Suppl.* p. 779 (see synon.).

D.10–11/18–19. A.3/9–10. C.17. L.r.100–120/85–110. L.tr.36/—.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—5 to $5\frac{1}{2}$ diameters in length of head, rather above 1 from end of snout and $\frac{3}{4}$ apart. Upper profile of head somewhat concave. Lower jaw much longer than the upper. *Fins*—dorsal spines moderate, the last slightly the longest, but only two thirds or three fourths as high as the highest dorsal ray; soft portions of dorsal and anal fins angularly rounded; second anal spine stronger than the third, but not quite so long. *Colour*—head and body greyish, becoming lighter on the abdomen; fins grey; everywhere

ornamented with round, black, white-edged spots, those on the body, dorsal, and caudal fins being the largest.

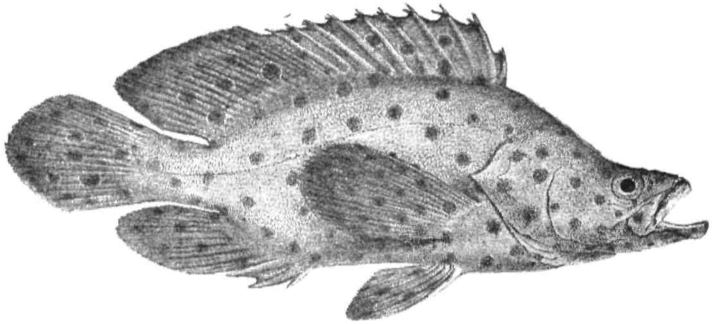

Fig. 140.—*Cromileptes altivelis.*

Hab. Seas of India to the Malay Archipelago and China; attaining two feet or more in length.

3. Genus **SERRANUS**, Cuv.

Syn. *Epinephelus*, sp., Bloch; *Cephalopholis*, sp., Bl. Schn.; *Paraserranus* and *Serranichthys*, Blkr.; *Labroperca*, *Mycteroperca*, *Bodianus*, *Enneacentrus*, *Petrometopon*, *Promicrops*, *Schistorus*, and *Menephorus*, Gill; *Prospinus*, Poey; *Alphestes*, *Dermatolepis*, Jordan & Swain.

Cullawah, Tamil.

Brachiostegals seven. Preopercle with its hinder margin more or less serrated, its lower edge generally entire; opercle with two

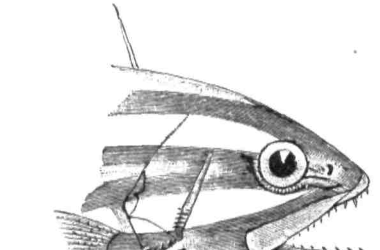

Fig. 141.—Head of young *Serranus latifasciatus*, from an individual 1·6 inch long, showing preopercular spine.

or three flat spines, that in the middle largest. Teeth villiform in the jaws, vomer, and palate, the outer maxillary and the inner

mandibular row generally larger; canines present. Tongue smooth. Dorsal fin single, having from 8 to 12 spines; anal with 3; caudal generally rounded, sometimes cut square, or emarginate. Scales small, ctenoid or cycloid. Pyloric appendages varying in number.

The colour of these fishes varies extensively in the same species, and can hardly be accepted as a trustworthy guide for grouping. The form of the preopercle is not invariably identical in every specimen of the same species, nor even on the opposite sides of a fish; a spine is occasionally present at its angle in the immature, becoming more or less absorbed in the adult (such a spine is figured in the accompanying woodcut, fig. 141). The sub- and inter-opercles may be serrated or smooth, as in *Serranus boenack*. The fins also alter with age, owing to the spines not increasing in length so rapidly as the rays, and even the latter may be comparatively shorter in the adult than in the young. The second anal spine is sometimes the longest in the immature, but becomes shorter than the third in the mature, especially when the second spine is the stronger. Occasionally there is an excess of one spine and a deficiency of a ray in the dorsal fin. The number of transverse rows of scales is very important amongst these fishes.

Geographical Distribution. The seas of temperate and tropical regions. The members of this genus in India are entirely marine; a few, it is true, ascend rivers, not for breeding but for predaceous purposes, restricting their range, however, to within tidal influence *.

Synopsis of Indian Species.

A. Dorsal with 11 (rarely 12) spines.	
L. tr. 14/40. Brownish red, with 4 vertical darker bands and subdistant small dark spots	1. *S. stoliczkæ*, p. 445.
L. tr. 19/47. Close reddish-brown spots, with bluish-white lines intervening	2. *S. areolatus*, p. 445.
L. tr. 25/56. Dark purplish above, lighter below, with numerous dark-edged yellow spots; tail square or emarginate	3. *S. coromandelicus*, [p. 445.
L. tr. 20/48. Reddish grey, with numerous narrow brown (blue?) longitudinal stripes; tail square	4. *S. undulosus*, p. 446.
L. tr. 16/32. Reddish brown, with large darker brown spots	5. *S. gilberti*, p. 446.
L. tr. 13/36. Reddish brown, with a network of light lines	6. *S. hexagonatus*, p. 447.
L. tr. 20/45. Deep grey, with small, rather distant, black spots	7. *S. maculatus*, p. 447.

* The statement, made more than once, that *Serranus* and other marine Percidæ have been taken near Nepal is simply an error, due to several fishes captured in the tidal Hooghly having been given to the National Collection with erroneous habitats on them. Blyth, Jerdon, and myself have all ineffectually tried to get the error corrected. A flying-fish, *Exocœtus*, was among Schlagintweit's collection *from Tibet!*

L. tr. 22/—. Deep purplish blue, tail and fins yellow; tail emarginate .... 8. *S. flavo-cæruleus*, [p. 448.

Reddish, brownish or yellowish, sometimes with dark vertical bands or with spots.. 9. *S. fasciatus*, p. 448.

L. tr. 21/—. Greyish olive, with unequal pearly-white spots .... 10. *S. hoevenii*, p. 449.

L. tr. 19–21/45. Purplish brown above, rose-coloured below, with 6 dark vertical bands.............................. 11. *S. diacanthus*, p. 449.

Brownish, with about 6 dark vertical bands and a few spots; dorsal, caudal, and anal yellow, spotted...................... 12. *S. sexfasciatus*, p. 449.

L. tr. 20/52. Young yellow, vertically banded; adults greyish brown, reticulated or mottled with blackish lines .... 13. *S. lanceolatus*, p. 450.

Greenish, variegated with red above, silvery white below .... 14. *S. erythrurus*, p. 450.

L. tr. 19/50. Brownish, paler below, with yellow spots throughout, sometimes with cross bands .... 15. *S. pantherinus*, p. 451.

Greyish brown, covered all over with black spots.............................. 16. *S. corallicola*, p. 451.

L. tr. 24/50. Dark reddish brown, spotted black throughout and with ill-defined bands across body .... 17. *S. salmoides*, p. 452.

Reddish brown, with 6 or 7 broad cross bands; head and fins only spotted .... 18. *S. semipunctatus*, [p. 452.

L. tr. 21/48. Brownish, body and vertical fins with white dots .... 19. *S. summana*, p. 453.

Fine white spots along each row of scales . 20. *S. dermochirus*, p. 453.

L. tr. 21/46. Olive, below yellow. Broad white bands on sides .... 21. *S. morrhua*, p. 453.

L. tr. 23/40. Greyish, spotted with yellow or brown; caudal emarginate.......... 22. *S. angularis*, p. 454.

L. tr. 22/56. Greyish, with irregular unequal brown spots .... 23. *S. fuscoguttatus*, p. 454.

L. tr. 17/44. Greyish, head golden; narrow longitudinal black lines on upper portion of side .... 24. *S. latifasciatus*, p. 455.

B. Dorsal with 9 spines.

L. l. 90–25, L. tr. 22–43. Yellowish brown, with blue longitudinal stripes .... 25. *S. boenack*, p. 455.

L. l. 115–120. Reddish brown, with longitudinal blue stripes.................. 26. *S. polleni*, p. 456.

L. tr. 14–16/40. Scarlet, with blue spots.. 27. *S. miniatus*, p. 456.

L. tr. 21/43. Dark brown, with small blue, black-edged spots .... 28. *S. guttatus*, p. 457.

L. tr. 10/26. Pale, with round or oval red spots.............................. 29. *S. leopardus*, p. 457.

L. tr. 27/40. Dull lake, reticulated blue lines on head and shoulders .... 30. *S. sonnerati*, p. 457.

L. tr. 18/36. Purplish, with 8 or 9 vertical dark bands .... 31. *S. boelang*, p. 458.

560. (1.) Serranus stoliczkæ.

Serranus stoliczkæ, *Day, Fish. India*, p. 11, pl. i, fig. 3.

D. 11/19. P. 17. A. 3/7–8. C. 17. L. r. 120/100. L. tr. 14/40.

Length of head $3\frac{2}{3}$ to $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 from end of snout and apart. Vertical border of the preopercle emarginate, rather coarsely serrated, most so at its angle. *Fins*—dorsal spines, excluding the first two, of about equal length; second anal spine strongest, the third somewhat the longest, equalling third of dorsal fin; caudal rounded. *Scales*—cycloid. *Colour*—light brownish red, becoming hyacinth-red on the sides and below, barred with four vertical darker bands, the anterior proceeding from the whole base of the spinous dorsal; these bands become indistinct in large specimens. Head and body spotted with reddish orange or yellow. Base of pectoral white, with a black crescentic band.

Hab. Coast of Sind, Muscat, and common at Aden, but not observed eastward of Sind; attaining at least 12 inches in length.

561. (2.) Serranus areolatus.

Perca areolata, *Forsk. Descr. Anim.* p. 42.
Serranus areolatus, *Day, Fish. India*, p. 12, pl. i, fig. 4, *Suppl.* p. 780 (see synon.).

Hekru, Maráthi; *Samana*, Arabi.

D. 11/17–18. P. 15. A. 3/8. C. 19. L. r. 105. L. tr. 19/47.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body 4 in the total length. *Eyes*—diameter 5 to 6 in length of head, $1\frac{1}{2}$ from end of snout and 1 apart. Vertical limb of preopercle oblique, serrated, and with much coarser teeth at its somewhat produced angle. *Fins*—the third to the fifth dorsal spines the longest, and equal to the highest rays; third anal spine not quite so strong as the second, bu longer; caudal emarginate. *Scales*—slightly ctenoid. *Colour*—re ish brown, with close hexagonal spots, formed by fine bluish-white lines throughout the head, body, and fins, the last have dark margins edged with white.

Hab. Red Sea, coasts of India, and Malay Archipelago; attaining a considerable size.

562. (3.) Serranus coromandelicus.

Serranus waandersi, *Day, Fish. India*, p. 12, pl. viii, fig. 1 (nec *Bleeker*).
Serranus coromandelicus, *Day, ib.* p. 746.

D. 11/17. P. 18. A. 3/8. C. 17. L. r. 120–130/110–120. L. tr. 25/56.

Length of head $3\frac{2}{3}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ to $5\frac{1}{2}$ in length of head, $1\frac{1}{3}$ from end of snout, and from $\frac{2}{3}$ to nearly 1 apart. Vertical border of the preopercle rather strongly serrated, more especially at its angle, which is

not produced. *Teeth*—a narrow band along the centre of the tongue. *Fins*—dorsal spines of moderate length, increasing to the fourth, rays rather higher than the spines; anal spines rather strong, the third the longest, and equal to four fifths of the highest in the dorsal fin; caudal cut square in the young, but slightly emarginate in the adult. *Scales*—rather strongly ctenoid. *Colour*—dark purplish, lighter on the abdomen, the whole head and body as low as the pectoral fin, the dorsal and upper third of caudal covered with large, closely approximating, rather dark-edged blotches of yellow, which are rounded or hexagonal, those on the head being the smallest. Fins a little darker than the body, and stained with black at their edges; dorsal with a white margin; pectoral orange, upper half of caudal lighter than lower.

Hab. Seas of Bombay and Madras; attaining at least 2 feet in length.

563. (4.) Serranus undulosus.

Bodianus undulosus, *Quoy & Gaim. Voy. Uranie et Physicienne, Poiss.* p. 310.

Serranus undulosus, *Day, Fish. India,* p. 13, pl. ii, fig. 1, *Suppl.* p. 780 (see synon.).

D. 11/17–19. A. 3/8–9. L. r. 135/130. L. tr. 20/48. Cæc. pyl. above 50.

Length of head from $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter 4 to 5 in length of head, 1 to $1\frac{1}{4}$ from end of snout, and $\frac{1}{2}$ to $\frac{3}{4}$ apart. Preopercle serrated along its vertical edge, and with from two to four strong denticulations at its angle. *Fins*—dorsal spines moderate, the third to the fifth the longest, and nearly as high as the rays; second anal spine the strongest and nearly as long as the third; caudal cut square in the adult, but rather rounded in the young. *Scales*—ctenoid. *Colour*—reddish grey, becoming lighter on the abdomen; numerous longitudinal narrow brown (blue?) stripes of varying length, and usually somewhat sinuous, above the lateral line, more or less horizontal below it; dots and yellow lines on the head; fins rather dark, and stained at their edges.

Hab. Seas of India to the Malay Archipelago and China; not uncommon at Madras, where the young are numerous during the cold season. This fish attains at least 4 feet in length.

564. (5.) Serranus gilberti.

Serranus merra, *Day, Fish. India,* p. 13, pl. ii, fig. 2 (nec *Bloch*?) (see synon.).

Serranus gilberti, *Richardson, A. M. N. H.* ix, 1842, p. 19; *Day, Fish. India,* p. 746.

D. 11/16–17. P. 18. A. 3/8–9. C. 17. L. r. 90/82. L. tr. 16/32.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ diam. from end of snout and apart. Snout obtuse. Preopercle rounded, its vertical boarder coarsely but evenly serrated. Central opercular spine well developed. *Fins*—dorsal spines rather strong, the fourth

somewhat the highest; pectoral large, as long as the head, and longer than the ventral; second anal spine strongest, and about as long as the third, which slightly exceeds the second of the dorsal fin; caudal fan-shaped. *Scales*—ctenoid. *Colour*—reddish brown, covered with large brown spots; the marks on the body larger than on the head, and usually hexagonal; pectoral with a dark semilunar mark over its base, divided by a light band from the dark grey of the rest of the fin, which, as well as the ventral and anal, has a black margin.

Hab. Seas of India, the Malay Archipelago, and China.

565. (6.) Serranus hexagonatus.

Perca hexagonata, *Bl. Schn. Syst. Ich.* p. 323.
Serranus hexagonatus, *Day, Fish. India*, pp. 14, 746, pl. ii, fig. 3 (see synon.).

Naambu, Bel.; *Pulli-cullawah*, "Spotted Perch," Tam.

D. 11/15–17. P. 16. A. 3/8. L. r. 110/95. L. tr. 13/36. Cæc. pyl. 32.

Length of head from $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 to $1\frac{1}{4}$ from end of snout, and $\frac{1}{3}$ to 1 apart. Vertical limb of preopercle finely serrated in its upper two thirds, more coarsely so in its lower third, especially at its angle. *Fins*—dorsal spines of moderate strength, the fourth the longest; second anal spine strongest and slightly the longest; caudal obtusely rounded. *Scales*—ctenoid. *Colour*—reddish brown with a light reticulation, causing the body, and also the pectoral, soft dorsal, and caudal fins, to be covered with hexagonal or sometimes rounded markings. In some specimens the dark blotches become more confluent, the light reticulations being indistinct.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago to the Pacific.

566. (7.) Serranus maculatus.

Holocentrus maculatus, *Bl. Ich.* t. 242, fig. 3 (young).
Serranus maculatus, *Day, Fish. India*, p. 14, pl. ii, fig. 4 (see synon.).

B. vii. D. 11/17–18. P. 18. A. 3/8. C. 17. L. r. 106/95. L. tr. 20/45.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body nearly 4 in the total length. *Eyes*—diameter from $4\frac{1}{4}$ to 5 in length of head, rather above 1 from end of snout, and 1 apart. Preopercle rounded, with its vertical border strongly serrated, its angle produced, and with about eight coarse denticulations. *Fins*—dorsal spines moderate; the third is half the length of the head, and one half longer than the rays; the last is nearly as long as the rays; second anal spine strongest, but not so long as the third; caudal cut square but with rounded angles. *Scales*—ctenoid. *Colour*—deep grey, with round, somewhat distant black spots on the head, pectoral, and ventral fins; oval vertical spots on the anterior half of the body, becoming short thick sinuous lines on the last half; the spinous dorsal

black-edged; the soft dorsal, anal, and caudal with a black edge and white margin.

Hab. East coast of Africa, seas of India, Andamans to the Malay Archipelago, and China.

567. (8.) Serranus flavo-cæruleus.

Holocentrus flavo-cæruleus, *Lacép. H. N. Poiss.* iv, pp. 331, 367.
Serranus flavo-cæruleus, *Günther, Catal.* i, p. 145; *Day, Fish. India*, p. 15, pl. iii, fig. 1 (see synon.).

Mungil cullawah, Tam.; *Kaha-laweyah*, Cingalese.

D. 11/16–17. P. 17. A. 3/7–8. C. 17. L. r. 120/115. L. tr. 22/—.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ to $5\frac{1}{2}$ in the length of head, $1\frac{1}{2}$ from end of snout, and 1 apart. Preopercle with its vertical limb finely serrated, more coarsely so at its angle. *Fins*—dorsal spines rather strong, increasing in length to the third, which is rather longer than the soft portion of the fin; second anal spine not quite so long as the third; caudal emarginate. *Scales*—ctenoid; those on the chest and abdomen very small. *Colour*—head and body of a deep purplish blue; free portion of the tail and all the fins gamboge-yellow; some yellow on the snout, maxilla, chest, and opercular spines; ventral and caudal with fine black tips.

Hab. Seas of India to the west coast of Africa.

568. (9.) Serranus fasciatus.

Perca fasciata, *Forsk. Descr. Anim.* p. 40.
Serranus fasciatus, *Day, Fish. India*, p. 15, pl. iii, fig. 2 (see synon.).

Teda, Maráthi.

D. 11/15–17. P. 18. A. 3/7–8. C. 17. L. l. 80–90. L. r. 95/92.

Length of head from $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 from end of snout, and $\frac{3}{4}$ apart. Preopercle rather strongly serrated along its vertical border, rather more coarsely so at its angle, above which it is somewhat emarginate. Sub- and inter-opercles either entire, or with a very few fine serrations. *Fins*—dorsal spines from the third subequal, not so high as the rays; second anal spine the strongest, a little longer than the third, which nearly equals the last in the dorsal fin; caudal rounded. *Scales*—ctenoid; from 12 to 14 rows between the lateral line and the base of the sixth dorsal spine. *Colour*—in typical *S. fasciatus* reddish or yellowish, with five dark vertical bands, a fine black edge along the whole of the dorsal fin. In var. *oceanicus* the cross bands may be absent; in var. *marginalis* brownish or yellowish, the dorsal and caudal fins being black-edged; in var. *variolosus* brownish, with spots over the head, body, and soft dorsal fins.

Hab. From the Red Sea through those of India to the Malay Archipelago and beyond.

569. (10.) Serranus hoevenii.

Serranus hoevenii, *Bleeker, Batav. Genootsch. Verhand.* xxii, 1849, *Perc.* p. 36.
Serranus tumilabris, *Day, Fish. India*, p. 16, pl. iii, fig. 3, *Suppl.* p. 780 (see synon.).

D. 11/16. P. 17. A. 3/8. C. 19. L. r. 95/85. L. tr. 21/—.

Length of head from 3 to $3\frac{1}{2}$, height of body from $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter varies considerably. Vertical border of preopercle slightly emarginate, the angle rounded, the whole finely serrated, most coarsely at the angle. *Fins*—dorsal spines from the third subequal, from $\frac{2}{5}$ to $\frac{1}{3}$ of the height of the body; second anal spine the strongest, equal to or not quite so long as the third; caudal rounded. *Scales*—ctenoid. *Colour*—greyish olive, darkest along the back. Body and head covered with irregularly sized pearly-white spots, a black line on the maxilla. Fins dark grey, externally nearly black, the pectoral, ventral, soft dorsal, and anal with a narrow white border; the whole of the dorsal fin white-spotted. The colours vary much with age.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago.

570. (11.) Serranus diacanthus.

Serranus diacanthus, *Cuv. & Val. H. N. Poiss.* ii, p. 319; *Day, Fish. India*, pp. 17, pl. iii, fig. 4, *Supp.* p. 780 (see synon.).

Damba, Sind.; *Chaandcha*, Baluch.

D. 11–12/16–15. A. 3/8–9. C. 17. L. r. 100/95. L. tr. 19–21/45.

Length of head 3 to $3\frac{1}{3}$, height of body 4 to 5 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, 1 from end of snout and also apart. Vertical limb of preopercle strongly serrated, with two or three coarse teeth at its angle. *Fins*—dorsal spines rather weak and of nearly equal length from the third; second anal spine rather longer than the third, and equal to the second of the dorsal fin; caudal rounded. *Scales*—ctenoid. *Colour*—brownish, with a tinge of pink on the back, becoming rose-coloured on the abdomen. Six dark vertical bands, the first crossing the head, the last crossing the free portion of the tail. Fins darkest at their margins.

Hab. Coasts of Baluchistan and through the seas of India; also Madagascar, but apparently not east of the Bay of Bengal; at Karáchi, where they were very common, I took specimens up to 18 inches in length.

571. (12.) Serranus sexfasciatus.

Serranus sexfasciatus (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* ii, p. 360; *Day, Fish. India*, p. 17 (see synon.).

D. 11/15. P. 17. V. 1/5. A. 3/8. C. 17. L. l. 85.

Length of head $3\frac{2}{3}$, height of body 4 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 from end of snout, and $\frac{3}{4}$ apart.

Vertical limb of preopercle rather coarsely serrated, with two large spinous teeth at its angle, the inferior of which is directed somewhat downwards. *Fins*—dorsal spines moderately strong, increasing in length to the fourth and fifth, which equal nearly half the length of the head, but are not quite so high as the rays; caudal rounded; second anal spine stronger than the third, but not quite so long. *Scales*—ctenoid. *Colour*—brownish, with about six vertical darker bands, about as wide as the ground-colour; a few irregular dark spots about the body; dorsal, caudal, and anal yellow, with numerous round black spots, those at the hind edge of the caudal almost forming a black band with a white outer edge; pectoral and ventral greyish.

Hab. I have not obtained this species in India, but a specimen presented by B. H. Hodgson, Esq., is in the National Collection labelled from "the East Indies." There is some doubt about the locality.

572. (13.) Serranus lanceolatus.

Holocentrus lanceolatus, *Bloch, Ich.* t. 242, fig. 1.
Serranus lanceolatus, *Cuv. & Val. H. N. Poiss.* ii, p. 316; *Day, P. Z. S.* 1869, p. 512, *and Fish. India*, pp. 18, 101, pl. iv, fig. 1 (see synon.).

Kurrupu, Mal.; *Commaaree*, if young *Wutla-callawah* or "perch with a sore head," Tam.; *Gussir*, Sind.; *Bole*, Chittagong; *Nga-towktoo-shweydoo*, Arracan; *Panni min* and *Pilli punni*, Tel.

D. 11/14–16. A. 3/8–9. L. r. 110/70. L. tr. 20/52. Cæc. pyl. many.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 6 to 8 in length of head, 1 to $1\frac{1}{2}$ from end of snout, and from 1 in the young to $1\frac{1}{4}$ in the adult apart. Preopercle with its vertical edge having a shallow emargination above the angle, and finely serrated, becoming somewhat coarsely so at the angle. *Fins*—dorsal spines not so high as the rays; second anal spine stronger but shorter than the third; caudal rounded. *Scales*—cycloid, about 15 rows between the sixth dorsal spine and the lateral line. *Colours*—vary with age, the very young being of a fine citron or sulphur ground-colour, having irregular vertical bands and markings, which become more distinct as the age of the fish advances. Up to a foot or even eighteen inches in length, the ground-colour continues to be bright yellow, with five broad, vertical, blackish blue bands. Fins yellow with black spots or blotches. In the adult the black bands disappear, the ground-colour becomes greyish brown, the whole being reticulated with greyish-black lines.

Hab. East coast of Africa and seas of India to the Malay Archipelago; attaining a large size.

573. (14.) Serranus erythrurus.

Serranus erythrurus, *Cuv. & Val. N. H. Poiss.* ii, p. 320; *Day, Fish. India*, p. 18.

D. 11/16. P. 17. V. 1/5. A. 3/9. C. 17.

Preopercle rounded, its vertical border finely serrated, its horizontal margin entire. *Fins*—rounded. *Colour*—on the back and upper surface of the head greenish, variegated with red, silvery white below; dorsal greenish; ventral, anal, and pectoral yellowish; tail reddish.

Hab. Malabar; growing to 3 feet in length.

574. (15.) Serranus pantherinus.

Holocentrus pantherinus, *Lacép. H. N. Poiss.* iii, t. 27, fig. 3, and iv, pp. 389 & 392.

Serranus malabaricus, *Day, Fish. India*, pp. 19, pl. iv, fig. 2, *Suppl.* p. 780 (see synon.).

Punni-calawah, Tam.; *Bontoo*, Tel.; *Bool*, Chittagong; *Nga-towktoo*, Arrak.; *Kyouk-theyga-kakadit*, Burm.; *Rāb-na-dah* and *O-ro-tam-dah*, Andamanese.

Variety, *S. bontoo*: *Madinawah bontoo*, Tel.; *Row-je-dah*, Andam.

D. 11–12/15–17. A. 3/8–9. L. r. 105/95. L. tr. 19/50. Cæc. pyl. 50–60.

Length of head $3\frac{1}{3}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 5 to 6 in length of head, 1 to $1\frac{1}{2}$ from end of snout, and the same apart. Vertical limb of preopercle slightly emarginate, finely serrated, more coarsely so at its rather square angle, where there exist from four to seven coarse teeth; occasionally there are two or three serrations on the interopercle. *Fins*—the dorsal spines from the third are of about the same height, but not so high as the rays; the second anal spine in most estuary specimens is as long as the third, but in marine ones it is often slightly shorter; caudal rounded. *Scales*—ctenoid. *Colour*—brownish, fading to grey or dirty white on the abdomen; the whole of the fish, even to the branchiostegal rays, covered with bright yellow or orange spots, which often become brown after death; three large blotches on the inter-opercle. The var. *S. malabaricus*, Bloch, is vertically banded. This variety is the commonest, mostly marine, and the bands are unusally well-marked in the young. In the variety *S. bontoo* the bands when present bifurcate and the spots are all black; this is marine and the rarest form, never appearing to attain to a large size. In the variety *S. coioides*, H. B.=*S. suillus*, C. V., the bands are absent, or else indistinctly visible; this is mostly taken in estuaries or large rivers, as the Hooghly at Calcutta.

Hab. Seas of India to the Malay Archipelago, China, and beyond; attaining to a very large size.

Russell recorded one taken at Vizagapatam in January 1786 which measured 7 feet in length, 5 in girth, and weighed upwards of three hundred pounds.

575. (16.) Serranus corallicola.

Serranus corallicola (*Kuhl & v. Hass.*), *Cuv. & Val.* ii, p. 336; *Day, Fish. India*, p. 20 (see synon.).

D. 11/15–16. P. 18. A. 3/8. L. r. 95/85–90. (Cæc. pyl. 9, Kner.)

Length of head from $3\frac{2}{5}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ to over 4 in total length. *Eyes*—diameter from $4\frac{1}{3}$ to 5 in length of head, and from $\frac{1}{2}$ to 1 apart. Vertical edge of the preopercle serrated. *Fins*—dorsal spines increase to the third or fourth, which are about $\frac{2}{5}$ the height of the body, and $\frac{1}{5}$ lower than the rays; second anal spine the strongest, a little longer than the third, and equal in length to the last in the dorsal fin; caudal rounded. *Scales*—ctenoid on the body, about 14 rows between the lateral line and the base of the sixth dorsal spine. *Colour*—greyish brown, covered all over with black spots; soft dorsal, anal, pectoral, and caudal with a light edge.

Hab. Stated by Kner to have been taken at Madras; also found in the Malay Archipelago.

576. (17.) Serranus salmoides.

Holocentrus salmoides, *Lacép. H. N. Poiss.* iii, pl. xxxiv, fig. 3, iv, p. 346.

Serranus salmoides, *Day, Fish. India*, p. 20, pl. iv, fig. 3 (see synon.).

D. 11/15–16. P. 18. A. 3/8. C. 17. L. r. 105/90. L. tr. 24/50.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body $3\frac{3}{4}$ to 4 in the total length. *Eyes*—diameter $6\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to 2 from end of snout, and $1\frac{1}{2}$ apart. Preopercle slightly emarginate, serrated along its vertical margin, with five or six denticulations at its angle. *Fins*—third dorsal spine one third of the length of the head, they gradually decrease to the last, but none are so long as the rays; second anal spine the strongest, but not so long as the third; caudal rounded. *Scales*—cycloid on the head, ctenoid on the body. *Colour*—dark reddish brown, having round black spots over the head, body, and fins, those on the head and jaws small. Large blotches or ill-defined bands on the body.

Hab. Red Sea, seas of India to the Malay Archipelago; not common in India.

577. (18.) Serranus semipunctatus.

Serranus semipunctatus, *Cuv. & Val. H. N. Poiss.* ii, p. 341; *Day, Fish. India*, p. 20 (see synon.).

D. 11/16. P. 17. V. 1/5. A. 3/8. C. 17.

Length of head $3\frac{1}{3}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter 6 in length of head, $1\frac{1}{3}$ from end of snout, $1\frac{1}{4}$ apart. Serrations on preopercle strong; three coarse teeth at its angle, but they are not spiny as in *S. sexfasciatus*. *Fins*—dorsal spines moderately strong, increasing in length to the fifth; third anal spine a little the longest, and equalling the third of the dorsal; caudal large, fan-shaped, and equal to the pectoral in size. *Colour*—body reddish brown, with six or seven broad darker vertical cross bands; head and first portion of the body, as well as the free portion of the tail, with some small well-marked spots; dorsal and anal yellow, and likewise spotted; ventral grey.

Hab. Pondicherry; attaining at least 12 inches in length.

578. (19.) Serranus summana.

Perca summana, *Forsk. Descr. Anim.* p. 42.
Serranus summana, *Day, Fish. India*, p. 21, pl. iv, fig. 4 (see synon.).

D. 11/15–16. P. 17. A. 3/8. C. 17. L. r. 100/90. L. tr. 21/48.

Length of head from $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body from $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter from 4 to 5 in length of head, $1\frac{1}{3}$ from end of snout and also apart. Preopercle with a very shallow emargination above its angle, its vertical border finely serrated. *Fins*—dorsal spines moderate, the third to the fifth being the longest; second anal spine the strongest, rather longer than the third, and equalling the highest in the dorsal fin; caudal rounded. *Scales*—ctenoid on the body, about 13 rows between the lateral line and the base of the sixth dorsal spine. *Colour*—brownish, the body and vertical fins covered with small round white dots, which are minute on the head or even absent, a black spot above the maxillary; soft portions of dorsal and anal fins with dark edges, having white margins.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago; very common at the Andamans.

579. (20.) Serranus dermochirus.

Serranus dermochirus, *Cuv. & Val. H. N. Poiss.* vi, p. 513; *Day, Fish. India*, p. 21.

B. vii. D. 11/16. P. 17. V. 1/5. A. 3/8. C. 17.

Length of head $3\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, 1 from end of snout, and nearly 1 apart. Preopercle with its vertical margin finely serrated. *Fins*—dorsal spines strong, increasing in length to the fourth. *Colour*—the specimen appears to be covered with fine white spots along each row of scales. It much resembles *S. summana*, and is probably identical with it.

Hab. Malabar.

580. (21.) Serranus morrhua.

Serranus morrhua, *Cuv. & Val. H. N. Poiss.* ix, p. 434; *Day, Fish. India*, p. 21, pl. v, fig. 1, *Suppl.* p. 780 (see synon.).

D. 11/14–15. P. 19. A. 3/8. C. 17. L. r. 130/115. L. tr. 21/46.

Length of head nearly 3, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in the length of head, 1 from end of snout, and $\frac{1}{2}$ apart. Vertical limb of preopercle slightly oblique, serrated, and with three or four strong denticulations at its angle. *Fins*—dorsal spines moderately strong, increasing in length to the third, which is nearly as high as the rays; third anal spine the strongest, the second of nearly similar length and about equal to the third of the dorsal fin; caudal rounded. *Scales*—on body ctenoid, 14 rows between the lateral line and the base of the sixth dorsal spine.

higher than the rays; second anal spine much the strongest and longest, equalling the length of the pectoral fin; caudal rounded. *Scales*—finely ctenoid, 10 rows between the lateral line and the

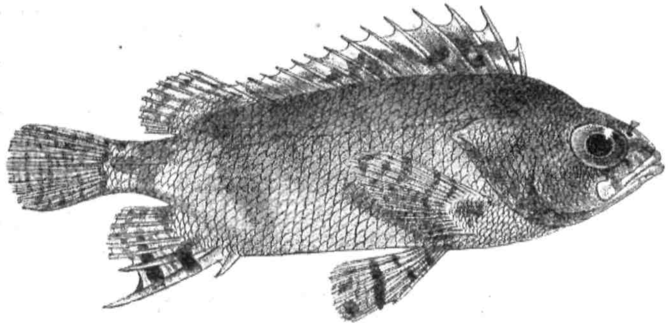

Fig. 145.—*Myriodon waigiensis.*

ventral fin. *Colour*—reddish, marbled with brown; some dark bands radiate from the eyes. All the fins spotted, blotched, and banded with brown or black.

Hab. Nicobars to the Australian seas.

7. Genus **DIPLOPRION** (Kuhl & v. Hass.), Cuv. & Val.

Branchiostegals seven. Body oblong, compressed. Opercle spiny; preopercle with a double edge, the outer of which is denticulated. Teeth villiform in jaws, vomer, and palatines; no canines; tongue smooth. Two dorsal fins, the first with eight spines; anal with two. Scales small, adherent. Pyloric appendages few.

595. (1.) **Diploprion bifasciatum.**

Diploprion bifasciatum (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* ii, p. 137, pl. 21; *Day, Fish. India*, p. 28, pl. ix, fig. 2 (see synon.).

Anoovah meen, Tam.

D. 8 | 14–15. A. 2/11–13. C. 17. L. r. 113/100–105. L. tr. 12.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ from end of snout, and $\frac{3}{4}$ apart. Approximating portions of sub- and interopercles serrated. Opercle with its two upper spines large, followed inferiorly by several smaller ones. *Fins*—third and fourth dorsal spines the highest, and nearly equal to the length of the head behind the front edge of the orbit; they decrease in length to the last, which is very short; anal spines also very short; caudal rounded. *Colour*—gamboge-yellow, with two broad black cross bands.

Hab. Seas of India, to China and Japan.

8. Genus LUTJANUS, Bloch.

Syn. *Diacope* and *Mesoprion*, Cuv. & Val.; *Genyoroge*, Cantor; *Macolor*, Bleeker; *Proamblys*, *Hypoplites*, *Rhomboplites*, *Oxyurus*, *Evoplites*, and *Tropidinius*, Gill.

Branchiostegals seven. Body oblong, compressed; snout elongated. Preopercle serrated, with or without a notch on its vertical border to receive a knob, which is sometimes developed on the interopercle. Opercle rarely with one, more generally with two or three indistinct points. Villiform teeth in both jaws; canines in the upper, with smaller ones in the lower jaw, and laterally a row of canine-like teeth; villiform teeth likewise on the vomer and palate; when present on the tongue, minute. Dorsal fin single, with from 9 to 12 spines; anal with 3. Pectorals pointed; caudal rounded, truncated, or emarginate. Scales ctenoid, of moderate or rather small size, one or two enlarged rows over the nape. Pyloric appendages few or absent. Air-bladder simple.

Geographical Distribution. Tropical seas.

Uses. All these fishes are good as food, though some are insipid. They are extensively salted and dried in many localities.

Amongst the *Lutjani*, when immature (as in a few *Serrani*), a spine sometimes exists at the angle of the preopercle; as age advances it becomes gradually absorbed. Instead of one there may be several spine-like denticulations at this spot in the fry, which also disappear. The interopercular knob (fig. 146), in those species which possess one (=genus *Diacope*, Cuv. & Val., or *Genyoroge*, Cantor), appears in two distinct modes—either as well formed from birth, with a notch in the vertical border of the preopercle—or else the knob is gradually formed, and as it increases in size it presses

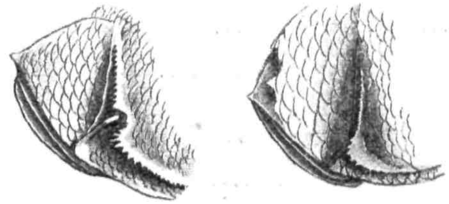

Fig. 146.—Gill-covers of *Lutjanus*. The interopercular knob and preopercular notch are present in the left-hand figure (*Diacope*), wanting in the right (*Mesoprion*).

against the vertical border of the preopercle, causing absorption of the spot above it, and thus creates a notch. It has been remarked of the *Serrani* that one dorsal ray occasionally assumes the form of a spine; but this seems to be rather rare among the Indian *Lutjani*, in which, although the spines may be increased, the rays are not usually diminished in number; an increase in the number of rays is of more frequent occurrence than in the spines.

The lateral blotch is sometimes most decided in the young, but whether it is a specific character or not remains to be solved.

longest dorsal; soft portion of anal angular; caudal slightly emarginate. *Scales*—in oblique, straight (not sinuous) rows above the lateral line, and also as low as a level with the eye, below which all are horizontal. *Colour*—scarlet, with a golden line along each row of scales and a nacreous spot across tail just behind base of dorsal. A narrow black edge to dorsal, caudal, and anal fins.

Hab. Seas of India to the Malay Archipelago.

601. (6.) **Lutjanus kasmira.**

Sciæna kasmira, *Forsk. Descr. Anim.* p. 46.
Lutianus bengalensis, *Day, Fish. India*, p. 33, pl. x, fig. 4, *Suppl.* p. 783 (see synon.).

Veri-keechan, Tam.

D.11/13–14. A.3/8. L.l.48. L.r.75–80/62–68. L.tr.7–8/18. C.p.0.

Length of head from $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter from $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{4}$ from end of snout, and $\frac{3}{4}$ apart. Vertical border of preopercle with a moderately deep notch above the rounded angle, finely serrated above, very coarsely at angle, some serrations continued on the lower margin. Interopercular knob distinct. *Fins*—dorsal spines rather strong, the fourth longest and one fourth higher than the rays; soft portion of fin rounded. Pectoral reaching to above anal spines; anterior anal rays the longest, lower edge of fin slightly convex; caudal emarginate. *Scales*—in oblique rows above lateral line, horizontal below. *Colour*—yellowish brown above, becoming yellowish white beneath. Four bright blue black-edged and slightly sinuous bands from the orbit across the opercles, the upper two to the dorsal fin, the third to behind the dorsal, and the fourth to the tail. Fins yellowish, dorsal with a dark edge and a light outer margin.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond; attaining at least 10 inches in length.

602. (7.) **Lutjanus fulvus.**

Holocentrus fulvus, *Bl. Schn. Syst. Ich.* p. 318.
Lutianus fulvus, *Day, Fish. India*, p. 34, pl. x, fig. 5 (see synon.).

D. 11/13. P. 17. A. 3/8. C. 17. L. l. 51. L. r. 72/61. L. tr. 9/21.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ of length of head, $1\frac{1}{4}$ from end of snout, and $\frac{3}{4}$ apart. Vertical border of preopercle deeply emarginate, with a produced rounded angle, serrated above the notch, almost spiny on the angle, a few fine serrations on the lower edge. Interopercular knob very well developed, pyramidal. *Fins*—dorsal spines strong, increasing in length to the fourth; from it they decrease to the last, which is scarcely above two thirds as high; soft portion of fin rounded, the height of the rays about two thirds

of the highest spine. Pectoral reaching to above the anal spines. Second anal spine much the strongest, third equalling the second of the dorsal fin; caudal emarginate. *Scales*—in oblique rows above the lateral line, horizontal below. *Colour*—uniform yellowish red, with a dark spot in the axil. Fins yellow; upper third of dorsal black, with a white margin; caudal with a black edge and white margin; a black mark across middle of first third of anal.

Hab. Andamans, Tahiti.

603. (8.) Lutjanus biguttatus.

Serranus biguttatus, *Cuv. & Val. H. N. Poiss.* vi, p. 507.
Lutianus biguttatus, *Day, Fish. India*, p. 34, pl. x, fig. 6 (see synon.).

D. 11/11–13. P. 16. A. 3/8. L. l. 50. L. r. 64/54. L. tr. 6/15.

Length of head $3\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ to $3\frac{1}{2}$ in length of head, 1 from end of snout, and $\frac{3}{4}$ apart. Vertical margin of preopercle finely serrated, with a moderately deep emargination to receive a badly developed interopercular knob, the angle rounded, lower edge almost entire. *Fins*—spines weak, those of dorsal increase in length to third and fourth, from these they decrease to the last; soft portion of fin (as also that of the anal) rounded and not half so high as the spines. Pectoral extends rather beyond ventral, but hardly to above anal; third anal spine rather the longest, but not so long as the rays; caudal slightly emarginate. *Scales*—in parallel rows below, and oblique above lateral line. *Colour*—yellowish grey above, yellowish white on the sides and abdomen, a broad black band from eye to middle of caudal fin, a second band from below jaws to above posterior end of base of anal. A white pearly spot under middle of spinous dorsal, and a second under commencement of rayed portion of fin.

Hab. Seas of India to the Malay Archipelago.

604. (9.) Lutjanus lineolatus.

Diacope lineolata, *Rüpp. Atl. Fische*, p. 76, t. xix, fig. 3.
Lutianus lineolatus, *Day, Fish. India*, p. 35, pl. xi, figs. 1, 2 (see synon.).

Nooleni, Tam.

D.11/12–13. A.3/8–9. L.l.50. L.r.52/50. L.tr.6–7/14. Cæc.pyl.4.

Length of head $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ from end of snout and also apart. Vertical border of preopercle with a slightly produced angle and almost horizontal lower edge, the vertical limb finely serrated, more coarsely so at the angle, the serrations continued along the posterior half of the lower limb. No interopercular knob. *Fins*—dorsal spines moderate, the third to the fifth the longest; they decrease to the last, which is about equal

to the rays. Pectoral pointed; second anal spine the strongest, and nearly equal to third; anal rays one fourth higher than dorsal. *Scales*—in oblique sinuous rows above lateral line to opposite end of dorsal fin, where they become horizontal, as are also those below the lateral line. *Colour*—purplish red along the back, more yellow below the lateral line. Upper third of the body with oblique and in places sinuous golden lines along each row of scales; below the lateral line the fish is longitudinally banded with pink and yellow alternately. Fins yellow, with a light band along the centre of the dorsal.

Hab. Red Sea, east coast of Africa, seas of India and of Malay Archipelago; very common off Madras.

605. (10.) **Lutjanus lemniscatus.**

Serranus lemniscatus, *Cuv. & Val. H. N. Poiss.* ii, p. 240.
Lutianus lemniscatus, *Day, Fish. India*, p. 36 (see synon.).

D. 10/14. P. 17. V./15. A. 3/8. C. 17. L. l. 56. L. tr. 8/21.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{3}$ from end of snout, and $\frac{3}{4}$ apart. Dorsal profile more convex than that of the abdomen. Vertical border of preopercle serrated and with a shallow emargination; interopercle with a badly developed knob. *Fins*—dorsal spines rather strong, increasing in length to the fourth, which is a little higher than the rays; the second and third anal spines of about the same length and equal to the third of the dorsal fin; caudal emarginate. *Scales*—in oblique rows above the lateral line, horizontal below. *Colour*—apparently dark red or yellow, with a wide brown or black band from the eye to the centre of the caudal fin, and another less defined and narrow parallel band below.

Hab. Ceylon to the Malay Archipelago.

606. (11.) **Lutjanus chrysotænia.**

Mesoprion chrysotænia, *Bleeker, Batavia Nat. Tijdsch.* ii, 1851, p. 170.
Lutianus chrysotænia, *Day, Fish. India*, p. 36, pl. xi, fig. 3 (see synon.).

D. 10/15. P. 16. A. 3/9. C. 17. L. l. 52. L. r. 75/70. L. tr. 8/22.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{3}{4}$ in length of head, $1\frac{1}{3}$ from end of snout, and 1 apart. Jaws of nearly equal length. Vertical border of preopercle having a very shallow emargination, its angle rounded but not produced, both margins finely serrated. No interopercular knob. Opercular points indistinct. *Fins*—dorsal spines weak, increasing in length to the third, from that they decrease to the last; soft portion of fin rounded, and much lower than spinous portion. Pectoral pointed, reaching to nearly above anal spines; first anal

rays highest, lower edge of anal rounded, caudal emarginate. *Scales*—in oblique rows above the lateral line, horizontal below. *Colour*—olive-green, with 3 dark bands from the eye, two running to the dorsal, the third to upper half of caudal, the latter has a golden band below it, below this is another dark horizontal band, and the abdomen beneath it golden; a deep black spot in the axil of the pectoral. Fins golden, a light margin to the spinous dorsal and first five or six rays; caudal with a darkish edge.

Hab. Nicobars to the Malay Archipelago.

607. (12.) **Lutjanus rivulatus.**

Diacope rivulata, *Cuv. & Val. H. N. Poiss.* ii, p. 414, pl. 38.
Lutianus rivulatus, *Day, Fish. India*, p. 37, pl. xi, fig. 4 (see synon.).

Cuttu pirium, Tam.

D.10/15. A.3/8–9. C.17. L.l.45–50. L.r.56/50. L.tr.8/19. C.pyl.5.

Length of head $3\frac{1}{3}$ to $3\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{3}$ from end of snout, and rather above 1 apart. Vertical margin of preopercle finely serrated, even in the well-developed notch that is above its angle to receive the interopercular knob; horizontal margin more coarsely serrated in its posterior portion than it is on its vertical border. Interopercle with a large triangular tuberosity directed a little upwards and backwards. *Fins*—dorsal spines strong, increasing in length to the third, fourth, and fifth, which are not quite so long as the highest of the dorsal rays, from the fifth the spines decrease in length; soft portion of the fin angularly rounded; ventral reaches the anus. Anal spines strong, the second equals the highest of the dorsal; soft portion of fin angular and one third longer than the dorsal; caudal slightly emarginate. *Scales*—in oblique rows above the lateral line, horizontal below, a strongly serrated shoulder scale, and two rows of broad scales over the nape. *Colour*—(in the *immature*) back olive, with a slate-coloured spot in centre of each scale; abdomen greyish with horizontal golden lines crossing the centre of each scale, and vertical dark ones along their bases. Several bright blue lines on preopercle, opercle, and snout. A white blotch four scales long on the lateral line opposite the third to the fifth soft dorsal ray, having a wide black edge to its upper third. Dorsal slate-coloured, above reddish with a narrow white edge; pectoral reddish; ventrals slaty with a dark edge; caudal bluish, tipped with red. Generally vertical bands are more or less distinct. In the *adult* about 15 inches in length the mark on the lateral line becomes indistinct, the golden shade is wanting, but the blue spots remain. The white edge to the fins is also usually absent.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

608. (13.) **Lutjanus argentimaculatus.**

Sciæna argentimaculata, *Forsk. Descr. Anim.* p. 47.
Lutianus argentimaculatus, *Day, Fish. India*, p. 37, pl. xi, fig. 5 (see synon.).

Támb, Mahr.; *Rangoo*, Tel.; *To-go-re-dah*, Andam.

D. 10/13–15. A. 3/8. C. 17. L. l. 45–50. L. tr. 7–8/16. Cæc. pyl. 4.

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to 5 in the length of head, 1 to $1\frac{1}{3}$ from end of snout, and $\frac{2}{3}$ to 1 apart. Vertical border of preopercle with a very shallow emargination, a rounded angle, and an oblique lower limb, the vertical border very finely serrated, most coarsely so at its angle and especially along the lower margin. A slight swelling on the interopercle. *Fins*—dorsal spines not very strong, increasing in length to the third, fourth, and fifth, from these they decrease to the last; soft portion of fin rather angular. Pectoral reaching to above anal spines. Second anal spine the strongest and nearly equal to the sixth of the dorsal; soft portion of anal angular; caudal emarginate, in some specimens rather deeply lunate. *Scales*—in horizontal rows above the lateral line, in some specimens (especially young) they are a little sinuous but do not become regularly oblique until under the soft portion of the dorsal fin; below the lateral line they are horizontal. *Colour*—cherry-red, darkest at the bases of the scales.. The front edge of the anal fin pinkish white, as also the first ventral ray. Upper margin of spinous dorsal orange. In some specimens there are dark spots on the dorsal, caudal, and anal fins. The very young have from six to nine narrow, vertical, silvery-white bands, which become more or less lost as age increases.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond. This fish attains upwards of two feet in length and is good eating.

609. (14.) **Lutjanus roseus.**

Lutianus roseus, *Day, Fish. India*, p. 38, pl. xi, fig. 6 (see synon.).

D. 10/14. P. 16. A. 3/8. C. 17. L. l. 48. L. r. 57/50. L. tr. 7/18.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{3}$ from end of snout, and 1 apart. Vertical border of preopercle emarginate, lower limb oblique, the whole finely serrated, most coarsely at the angle and along the lower edge. No tuberosity on the interopercle. *Fins*—dorsal spines moderately strong, the fourth the highest; from it they decrease to the last, the soft portion of the fin rather rounded, as high as the fourth spine. Ventral reaching nearly two thirds of the distance to the anal; second anal spine stronger and rather longer than the third and equal to the sixth dorsal, soft portion of fin one fifth higher than that of the dorsal; caudal rounded. *Scales*—in horizontal rows below the lateral line, and also above it so far as to below the middle of the dorsal spines, here the rows com-

mence running obliquely to the base of the soft dorsal, but become horizontal beyond the base of that fin. *Colour*—dark reddish brown, becoming dull cherry-red below the lateral line; fins with dark edges.

Hab. Seas of India to the Malay Archipelago.

610. (15.) **Lutjanus sillaoo.**

Lutianus sillaoo, *Day, Fish. India*, p. 39, pl. xii, fig. 2 (see synon.).

Nga-wet-pa-nee, Arracan.

D.10(11)/14. P.16. A.3/8–9. C.17. L.l.44. L.r.48/42. L.tr.6/15.

Length of head $3\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{3}{4}$ in length of head, $1\frac{1}{3}$ from end of snout, and 1 apart. Vertical border of preopercle with scarcely any trace of emargination, angle rounded, lower limb very oblique; the whole vertical edge very finely serrated, with a few coarser serrations at the angle. No interopercular knob. *Fins*—dorsal spines weak, the third and fourth about equal, from these they decrease to the last, which is only a little above half the height of the fourth; soft portion of the fin angular, and nearly as high as the spines. Pectoral reaching to above the last anal spine; ventral extending to the vent; second anal spine stronger than the third but not so long, the third equals the seventh dorsal spine. Caudal slightly emarginate. *Scales*—rows above lateral line rather oblique; below the lateral line they are horizontal. *Colour*—back greyish brown, chest orange, abdomen and sides light violet, each scale having a white edge. Spinous portion of dorsal greyish, soft portion with a more yellow tinge; pectoral reddish; caudal red with a black edge.

Hab. Seas of India; attaining at least four feet in length.

611. (16.) **Lutjanus lioglossus.**

Lutianus lioglossus, *Bleeker, Amsterdam, Verhand. Kon. Akad.* xiii, 1873, *Lutjanus*, p. 74; *Day, Fish. India*, p. 39, pl. xii, fig. 1 (see synon.).

D.10/13–14. P.16. A.3/8–9. C.17. L.r.60–52. L.tr.6–7/15.

Length of head $3\frac{1}{2}$, height of body $3\frac{2}{3}$ to 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to 2 from end of snout, and $\frac{3}{4}$ apart. Vertical border of preopercle with a very shallow emargination, and serrated in its whole extent; a very obscure interopercular knob. *Fins*—dorsal spines moderate, increasing in length to the fourth, the last spine one third shorter; soft portion of the fin somewhat rounded. Ventral reaching rather above half the distance to the anal. Anal spines rather short, the third slightly the longest, soft portion of the fin highest in front, lower edge straight; caudal emarginate. *Scales*—in oblique rows above lateral line, horizontal below. *Colour*—roseate, lightest below, with a black blotch on lateral line below first portion of soft dorsal.

Hab. Red Sea, seas of India and Malay Archipelago; attaining at least 18 inches in length.

rosy along the back, with a light golden band from the head to the tail along each row of scales. A large black blotch on the lateral line, mostly below it, opposite the commencement of the soft dorsal fin.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond.

616. (21.) Lutjanus unimaculatus.

Mesoprion unimaculatus, *Quoy & Gaim. Voy. Uranie & Phys.* p. 304.
Lutianus fulviflamma var. russellii, *Day, Fish. India*, p. 42, pl. xii, fig. 5, *Suppl.* 1888, p. 783.

Vella chembolay, Mal.; *Shemhara* and *Currumay*, Tamil.

D.10/13–14. A.3/8. C.17. L.l.50–54. L.tr.7–8/16. Cæc.pyl.5–6.

This form is so similar to the last that I consider it to be merely a variety, the proportions being the same. The distance from the eye to the snout and the size of the lateral blotch are a little more than in *L. fulviflamma*. *Colour*—yellow or rosy along the back, with three or four narrow brilliant golden bands passing obliquely upwards and backwards from the lateral line to the base of the dorsal fin, and three or four similar horizontal golden bands below the lateral line. A large black blotch on and mostly above the lateral line from the 22nd to the 31st scales.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond.

617. (22.) Lutjanus johnii.

Anthias johnii, *Bloch, Ich.* t. 318.
Lutianus johnii, *Day, Fish. India*, p. 42, pl. xiii, fig. 1 (see synon.).

Chembolay, Mal.; *Nya-pa-nee*, Burm.

D.10/13–14. C.17. L.l.48. L.r.50/46. L.tr.7/13. (Cæc.pyl.4, Kner.)

Length of head $3\frac{1}{4}$ to $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to 5 or even 6 in large specimens in length of head, $1\frac{1}{3}$ to $1\frac{1}{2}$ from end of snout, and from $\frac{3}{4}$ to 1 apart. Vertical border of preopercle finely serrated, more coarsely so at the angle, which is somewhat produced and rounded, lower border with a few serrations and crenulations. A very indistinct tuberosity on the interopercle is sometimes present. *Fins*—dorsal spines strong, increasing in length to the fourth, from this they decrease to the last, which is about one fourth shorter; soft portion of fin somewhat rounded, its longest rays exceed the highest spine. Ventral reaches the vent; second anal spine equals third spine of dorsal, the rayed portion of anal rounded and rather higher than that of the dorsal; caudal slightly emarginate. *Scales*—rows above lateral line parallel with profile of back, those below horizontal. *Colour*—yellowish, lightest on the abdomen, with a large black mark, of varying depths of colour, on the lateral line between the 22nd and 31st scales; age, season, and locality all exercise an influence on this

blotch; a dark line is almost invariably present along each row of scales. Fins yellow dashed with red; anal with a light front edge.

In the young the ocellus on the side is larger, and is surrounded by a light ring. This is *Serranus pavoninus*, Val.

Hab. Seas of India, Malay Archipelago, and beyond, ascending some distance up tidal rivers. This fish attains a foot or more in length.

618. (23.) Lutjanus gibbus.

Sciæna gibba, *Forsk. Descr. Anim.* p. 46, no. 48.
Lutjanus gibbus, *Bl. Schn. Syst. Ich.* p. 326; *Day, Fish. India*, p. 43, pl. xiii, figs. 2 & 3 (see synon.).

D. 10/14. P. 18. L. l. 50–55. L. r. 70/65. L. tr. 8/23. Cæc. pyl. 4–5.

Length of head $3\frac{2}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{3}$ (in young) to $4\frac{1}{4}$ (in adult) in length of head, $1\frac{1}{2}$ from end of snout, and 1 apart. Vertical border of preopercle with a very deep emargination succeeded by a broad and deep angle, its height half that of the vertical limb, above the notch the serrations are very fine, on the rounded, produced angle they are coarse, and a few are continued along the oblique lower edge. Interopercular knob well developed. *Fins*—the third to the fifth dorsal spines the longest, behind they gradually decrease, the last being three fourths of their height; soft portion of fin rounded in young, more pointed in adult. Pectoral reaches to nearly above the anal; ventral reaches the vent. Second anal spine strongest, it equals the highest in the dorsal fin; soft portion of fin angular. Caudal slightly notched in young, more emarginate in adult, the upper portion the longer. *Scales*—in oblique rows, above and below the lateral line. *Colour*—uniform crimson, dorsal and anal fins having a black edge with a white external margin; a white tip to caudal lobes; dark bands along bases of dorsal and anal fins; pectorals and ventrals yellow, the latter with a dark tip; caudal dark purple. In the *young*—body crimson, with a black band commencing at end of dorsal fin, and covering part of the tail and caudal fin, the latter having a white outer edge.

Hab. Red Sea, Andaman Islands and south seas. This fish attains at least 16 inches in length.

619. (24.) Lutjanus bohar.

Sciæna bohar, *Forsk. Descr. Anim.* p. 46, no. 47.
Lutianus bohar, *Day, Fish. India*, p. 44, pl. xiii, fig. 4.

D. 10/14. A. 3/8. C. 17. L. l. 50–55. L. r. 62/52. L. tr. 7/18.

Length of head $3\frac{1}{2}$, height of body 3 in the total length *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ from end of snout and also apart. Vertical margin of preopercle with a shallow notch, the whole serrated, most strongly at its rounded and slightly produced angle, lower edge oblique and likewise serrated; interopercle with a very small knob. *Fins*—dorsal spines of moderate strength, the

fourth the longest; soft portion of the fin rounded. Pectoral reaching to nearly above the anal, ventral scarcely so far; second anal spine strongest and somewhat the longest, equalling the third dorsal; soft portion of fin rounded, its lower edge straight; caudal somewhat deeply emarginate. *Scales*—in oblique rows above lateral line, horizontal below. *Colour*—brownish along back, becoming whiter on sides and below; two milk-white spots at base of dorsal fin, the first below 6th to 8th spines, the second below the last third of the soft dorsal; dorsal blackish brown; outer edges of caudal and front edge of anal blackish, the latter having a narrow white anterior margin; ventral black with a white outer edge.

Hab. Red Sea, seas of India, Malay Archipelago, and beyond.

620. (25.) Lutjanus marginatus.

Diacope marginata, *Cuv. & Val. H. N. Poiss.* ii, p. 425.
Lutianus marginatus, *Day, Fish. India*, p. 44, pl. xiii, fig. 5 (see synon.).

Sungarah, Tam.

D.10/13–14. P.16. C.17. L.l.50. L.tr.6–7/15. (Cæc.pyl.7, Kner.)

Length of head $3\frac{1}{2}$ to 4, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ from end of snout, and $\frac{2}{3}$ apart. Vertical border of preopercle finely serrated above the emargination, which is deep, angle rounded where the serration is coarsest, it is continued along the horizontal edge; sub- and interopercles entire, the latter having a large tuberosity directed upwards and slightly outwards. *Fins*—dorsal spines strong, the fourth the longest, from it they gradually decrease in length; soft portion of fin rounded, three fourths as high as the fourth spine. Pectoral reaching to above the first anal spine; ventral reaches the vent. Second anal spine the strongest and as long as the highest dorsal; soft portion of anal fin one third higher than that of the dorsal; caudal emarginate. *Scales*—in oblique rows above lateral line to opposite end of dorsal fin, where they become horizontal, as they likewise are below the lateral line. *Colour*—purplish yellow above the lateral line and golden below it. Generally no lateral blotch; lower third of dorsal fin coloured like the back, then a dark grey longitudinal band with a lighter one above it, followed by black, and edged with white; caudal dark purplish red with a white edge; pectoral, ventral, and anal flesh-coloured with a yellowish tint.

On the Malabar coast of India specimens are frequently taken with a black lateral blotch; on the Coromandel coast a few have the lateral mark faintly developed, but it is more commonly absent. This does not depend upon size or season, but may upon sex or locality; in specimens preserved in spirit the mark is liable to disappear.

Hab. East coast of Africa, seas of India, and the Malay Archipelago; attaining at least 16 inches in length.

621. (26.) Lutjanus yapilli.

Mesoprion yapilli, *Cuv. & Val. H. N. Poiss.* ii, p. 483.
Lutianus yapilli, *Day, Fish. India*, p. 45, pl. xiii, fig. 6 (see synon.).

D. 10/14. P. 17. A. 3/8. C. 17. L. l. 47. L. r. 48/47. L. tr. 6/14.

Length of head nearly 4, height of body $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in the length of head, 2 from end of snout, and $1\frac{1}{4}$ apart. Vertical border of preopercle with a very shallow emargination above the rounded angle, the whole border finely serrated, the serrations a little more coarse and widely separated at the angle and along the horizontal border. No interopercular knob. *Fins*—dorsal spines strong, the third three-quarters the height of the fourth, they decrease to the ninth which is only $\frac{4}{11}$ of the fourth spine; soft portion of dorsal rounded; ventral does not reach halfway to the anal. Second anal spine the strongest but not quite so long as the third, lower edge of anal rounded. *Scales*—in rows parallel to the back above the lateral line, horizontal below it. *Colour*—silvery grey on the back, becoming yellowish white on the abdomen; longitudinal yellowish bands along each row of scales; cheeks dashed with purple. Fins yellowish, dorsal, anal, and caudal edged with orange.

Hab. Coromandel coast of India and Island of Timor. It is closely allied to *L. johnii*.

· 622. (27.) Lutjanus quinquelinearis.

Holocentrus quinquelinearis, *Bloch, Ich.* iv, p. 84, t. 239.
Lutianus quinquelinearis, *Day, Fish. India*, p. 46, pl. xiv, fig. 1 (see synon.).

Karkutla támb, Marat.; *Kashabár*, Arabic.

D. 10/13-16. A. 3/8-9. C. 17. L. l. 56. L. tr. 8/19. Cæc. pyl. 5.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{3}$ in length of head, about 1 from end of snout, and $\frac{3}{4}$ apart. Vertical border of preopercle with a very deep emargination and a rounded angle, the whole serrated, the serrations at the lower angle coarse, lower edge also serrated. A strong interopercular knob. *Fins*—dorsal spines of moderate strength, increasing in length to the fourth, from it they slightly decrease to the last; soft portion of fin rounded, second anal spine rather longest and strongest, the rayed portion of anal highest in front, lower edge of fin rounded; caudal emarginate. *Scales*—in oblique rows above lateral line, horizontal below. *Colour*—olive-yellow, with, as a rule, a deep black mark on lateral line below the last few dorsal spines and the first few rays; some lines above the nape formed by a dark spot on each scale. Five blue bands from the eye: the three upper to the dorsal fin or its termination, the two lower unite on the hinder end of the opercle and run to the middle of the tail; the lowest band of all from the snout below

the eye is continued past pectoral fin to end of base of soft anal; fins yellow; caudal with a light tip.

Hab. Seas of India and Malay Archipelago. The species is common at Madras.

623. (28.) Lutjanus vitta.

Serranus vitta, *Quoy & Gaim. Voy. Uranie & Phys.* p. 315, pl. 58, fig. 3.
Lutianus vitta, *Day, Fish. India*, p. 46, pl. xiv, fig. 2 (see synon.).

D. 10/13. A. 3/8. C. 17. L. l. 50. L. r. 65–70/55–60. L. tr. 8/12.

Length of head from $3\frac{1}{3}$ to $3\frac{2}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ from end of snout, and $\frac{2}{3}$ apart. Vertical border of preopercle with a shallow emargination, the angle slightly rounded but not produced, the lower edge rather oblique; preopercle finely serrated along both edges, most coarsely at the angle. Sometimes there is a very indistinct interopercular swelling. *Fins*—dorsal spines of moderate strength, the fourth the longest, from it they gradually decrease to the last, which is two thirds as high as the first ray, whilst the soft portion is slightly lower than the third spine; caudal lunate. *Scales*—in oblique sinuous rows above lateral line as far as end of dorsal fin, beyond which as well as below the lateral line they are horizontal. *Colour*—yellowish red along the back, rosy below the lateral line; olive stripes along each row of scales above the lateral line and brilliant yellow below it. Fins orange; dorsal, anal, and tips of caudal margined with white. Sometimes, but not invariably, a broad black band from eye to above centre of caudal fin, and in such specimens the olive stripes in the upper third of the body are nearly black.

Hab. Seas of India to the Malay Archipelago and beyond.

624. (29.) Lutjanus madras.

Mesoprion madras, *Cuv. & Val. H. N. Poiss.* vii, p. 446.
Lutianus madras, *Day, Fish. India*, p. 47, pl. xiv, fig. 3.

D. 10/13–14. A. 3/8–9. C. 17. L. l. 50. L. r. 65/52. L. tr. 6/16.

Length of head $3\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 from end of snout, and $\frac{2}{3}$ apart. Vertical limb of preopercle not emarginate, the angle slightly produced and rounded, lower limb oblique, the whole serrated, most coarsely so at the angle; no interopercular knob. *Fins*—dorsal spines moderately strong, increasing in length to the fourth, they subsequently decrease to the last, which is rather above half the same length; soft portion of fin rounded and much lower than spinous. Pectoral not reaching to above anal; ventral reaches two thirds of distance to anal spines, the second of which is as strong as the third but slightly shorter; last anal ray half the height of first, lower edge of fin straight; caudal emarginate. *Scales*—in oblique rows above and horizontal below

lateral line. *Colour*—roseate, with oblique lines above the lateral line; below the lateral line the sides and abdomen are yellow, with narrow red horizontal bands. One specimen, captured December 1869, had a lateral band as in *L. vitta*.

Hab. Seychelles, Indian seas, and Malay Archipelago; attaining about a foot in length.

625. (30.) **Lutjanus decussatus.**

Mesoprion decussatus, *Cuv. & Val. H. N. Poiss.* ii, p. 487.
Lutjanus decussatus, *Day, Fish. India*, p. 47, pl. xiv, fig. 4 (see synon.).

D.10/13–14. P.15. A.3/8. C.17. L.l.50–54. L.tr.6–7/17. Cæc.pyl.3.

Length of head $3\frac{1}{2}$ to $3\frac{3}{4}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ diameter from end of snout, and nearly 1 apart. Snout pointed, lips rather thick; jaws of equal length in front. Vertical limb of preopercle with a shallow emargination, having fine serrations which are lost at the angle; a slight interopercular knob. *Fins*—third to fifth dorsal spines the longest; behind they decrease to the last; soft portion of fin rounded and lower than spinous; ventral reaches two thirds of distance to anal; first anal rays highest, lower margin of anal rounded; caudal forked, upper lobe the longer. *Scales*—in oblique rows above the lateral line, and in horizontal below. *Colour*—whitish, with six longitudinal black bands along the body, and six badly marked short vertical ones in its upper third descending from base of dorsal fin and crossing the former; a deep black spot at root of caudal. A white band across the occiput. Fins greyish, anal with a white front edge.

Hab. Seas of India to the Malay Archipelago, and beyond.

Third group. PRIACANTHINA.

9. Genus **PRIACANTHUS**, Cuv. & Val.

Branchiostegals six; pseudobranchiæ. Body oblong and somewhat elevated. Eyes large. Lower jaw prominent. Preopercle serrated behind and below as well as on the angle, which is produced into a flattened spine-like point; opercle with a point. Teeth villiform in the jaws, vomer, and palate, none on the tongue. A single dorsal fin, with nine or ten spines; anal with three. Scales small and ctenoid, extended on to the snout.

Geographical Distribution. Tropical seas.

Synopsis of Indian Species.

Light lake-red, vertical and ventral fins with narrow black edges .... 1. *P. hamrur*, p. 482.
Ventrals spotted with brown; a dark edge to dorsal and anal .... 2. *P. holocentrum*, p. 482.

626. (1.) **Priacanthus hamrur.**

Sciæna hamrur, *Forsk. Descr. Anim.* p. 45.
Priacanthus blochii, *Day, Fish. India*, p. 48, pl. viii, fig. 2, *Suppl.* 1888, p. 783 (see synon.).

B. vi. D. 10/13–14. P. 18. A. 3/14. C. 17. L. r. 110–120.

Length of head $3\frac{2}{3}$, height of body $3\frac{2}{3}$ in the total length. *Eyes*—large, in middle of length of head, $\frac{1}{2}$ diameter from end of snout. Preorbital serrated along both its upper and lower borders. *Fins*—dorsal spines of moderate strength, increasing in length to the last, which, however, is not quite so long as the rays. Pectoral short; ventral spine serrated on both edges; anal spines serrated anteriorly, the third the longest; caudal cut square. *Colour*—light lake-red, all the vertical as well as the ventral fins having a narrow black border.

Hab. Red Sea, east coast of Africa, seas of India, and Malay Archipelago.

627. (2.) **Priacanthus holocentrum.** (Fig. 148.)

Priacanthus holocentrum, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Perc.* p. 48; *Day, Fish. India*, p. 746, *Suppl.* p. 784 (see synon.).

Pasuwa, Tamil.

B. vi. D. 10/12–13. P. 17. A. 3/12–13. C. 16. L. l. 55.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and

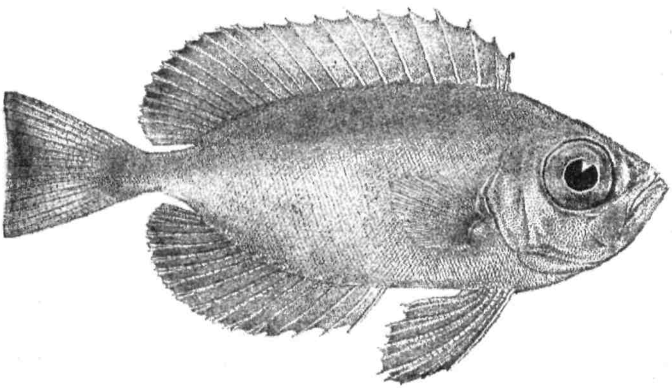

Fig. 148.—*Priacanthus holocentrum.*

about $\frac{2}{3}$ apart. Preorbital serrated below. Preopercle serrated, having a large, flat, and serrated spine, equal in length to half the diameter of the orbit. Two opercular spines; subopercle serrated, a shoulder-spine. *Fins*—second dorsal spine two thirds as high as the last, which is the longest; third anal spine the

longest, the two first serrated anteriorly. *Colour*—rose-coloured above, becoming nearly white on the sides and beneath; ventral fins spotted with brown; a dark edge to dorsal and anal fins.

Hab. Madras to the Malay Archipelago.

Fourth group. APOGONINA.

10. Genus **AMBASSIS** (Comm.), Cuv. & Val.

Syn. *Chanda*, pt., Ham. Buch.; *Hamiltonia* et *Ambassus*, Swains.; *Bogoda*, *Parambassis*, and *Pseudambassis*, Bleeker.

Branchiostegals six; pseudobranchiæ well developed. Body compressed, more or less diaphanous. Lower limb of preopercle with a double serrated edge; opercle without prominent spine. Villiform teeth on jaws, vomer, and palate, sometimes on the tongue; canines rarely present. Two dorsal fins, the first with 7 spines, the anal with 3; a forwardly directed recumbent spine in front of the base of the dorsal. Scales cycloid, of moderate or small size, frequently deciduous. Lateral line complete, interrupted, incomplete or absent.

Geographical Distribution. Shores of Indian Ocean. Some of the smaller species are exclusively found in fresh water.

Uses. This genus consists of little bony fishes, which rarely exceed six inches in length, and are generally far less. The poorer classes eat them, and owing to their shape they are easily dried without salt.

The species are distinguished with difficulty. The relative length of the second or third dorsal spine to that of the body often varies with the size of the specimen. The number of soft rays is not constant. The lateral line is subject to variation. Colours likewise are not constant. The characters least subject to change appear to be the serrations on the sub- and interopercles, the preorbital, and around the orbit; those on the vertical border of the preopercle are inconstant in some species.

Synopsis of Indian Species.

A. Anal elongate, 3/13–17; interopercle not serrated; scales very small.	
Large teeth near symphysis of mandible; a shoulder-spot	1. *A. nama*, p. 484.
Teeth small; a dark shoulder-spot	2. *A. ranga*, p. 485.
Teeth small; no shoulder-spot; a golden spot on occiput	3. *A. baculis*, p. 485.
B. Anal shorter, 3/9–12; scales moderate; l. l. 26–41.	
a. Interopercle serrated.	
Lateral line 35–41, continuous	4. *A. thomassi*, p. 486.
L. l. 26–28, continuous; height of body $\frac{2}{5}$ total length	5. *A. nalua*, p. 486.
L. l. interrupted	6. *A. interrupta*, p. 487.
L. l. 30, continuous; height $\frac{1}{3}$ total length	7. *A. dayi*, p. 487.

b. Interopercle not serrated.

L. l. continuous; eyes ½ a diameter apart . 8. *A. commersoni*, [p. 488.

L. l. continuous; eyes ⅔ diam. apart .... 9. *A. myops*, p. 488.

L. l. interrupted; 2 rows of scales on suborbitals .... 10. *A. gymnocephalus*, [p. 489.

L. l. semi-interrupted; 1 row of scales on suborbitals .... 11. *A. urotænia*, p. 489.

c. Imperfectly known .... 12. *A. thermalis*, p. 490.

628. (1.) **Ambassis nama.** (Fig. 149.)

Chanda nama, *Ham. Buch. Fish. Ganges*, pp. 109, 371, pl. 39, fig. 39.
Ambassis nama, *Day, Fish. India*, p. 50, pl. xiv, fig. 5 (see synon.).

Mucknee and *Ched-du-ah*, Punj.; *Son-dah*, Assam.; *Pud-du* and *Put-to-lah*, Sind.; *Gáude-chiri*, Marát.; *Ak-ku-rati*, Tel.; *Buck-ra* and *Pom-pi-ah*, N.W. Prov.; *Cart-kana* and *Goa-chuppi*, Ooriah.

D. 7 | 1/13–17. P. 13. A. 3/14–17. C. 17.

Length of head 4 to $4\frac{1}{2}$, height of body from $2\frac{3}{4}$ to 3 in the total length. *Eyes*—diameter about 3 in length of head, $\frac{2}{3}$ to $\frac{3}{4}$ from end of snout and also apart. Lower jaw much longer than upper. Posterior-superior margin of preorbital denticulated. Vertical

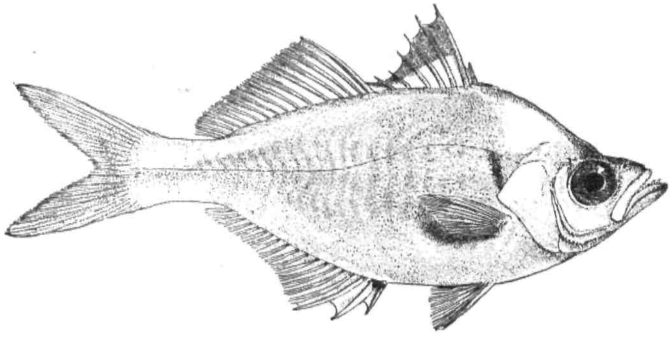

Fig. 149.—*Ambassis nama.*

border of preopercle entire, except near the angle; the double border very slightly denticulated at its lower edge in the young, often entire. Sub- and interopercles entire. *Teeth*—two or three large crooked canines on either side of the lower jaw; an outer and an inner enlarged row in both jaws. *Fins*—second dorsal spine the longest (in a few specimens the third), and as long as first ray, the rays gradually decrease in height; the third anal spine the longest and strongest, equalling the height of the longest in the dorsal fin. Caudal deeply forked. *Scales*—minute. *Lateral line*—always indistinct, entire in some specimens, in others soon terminating or absent. *Colour*—yellowish olive, covered all over with minute black dots, which on the shoulder are collected into an oblong patch, having its longest diameter vertical; summit of the head

and top of the eyes black. Fins orange, upper half of first dorsal deep black; a dark upper edge to second dorsal; caudal dark with a light outer margin; anal with a black mark over the bases of the spines. In some specimens taken at Hurdah the caudal was black-tipped.

This fish shows considerable local variations, which have caused its being described under more than one name.

Hab. Throughout the fresh waters of India, Assam, and Burma; attaining 3 or 4 inches in length.

629. (2.) **Ambassis ranga.**

Chanda ranga, *Ham. Buch. Fish. Ganges*, pp. 113, 371, pl. 16, fig. 38.
Ambassis ranga, *Day, Fish. India*, pp. 51, 746, pl. xiv, fig. 6 (see synon.).

Chandee, Beng. and N.W. Prov.; *Pee-dah*, Sind.; *Laal-chandee*, Ooriah.

D. 7 | 1/13–15. P. 11. A. 3/14–16. C. 17. L. r. 60–70. L. tr. 13/—.

In the adult, length of head $3\frac{1}{4}$ to 4, height of body $2\frac{1}{3}$ to $2\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and $\frac{3}{4}$ apart. Vertical border of preopercle sometimes entire, more commonly finely serrated, but in some specimens rather coarsely so; the double margin of horizontal border of preopercle serrated; sub- and interopercles entire. Preorbital with denticulations on its inferior edge, a strong tooth on its anterior superior angle directed towards the eye, and about five more along the upper edge of that bone. Another spine at the middle of the posterior edge of the orbit, with five more, decreasing in size, along its upper half. *Teeth*—all small, none on the tongue. *Fins*—second dorsal spine generally as long as the third; second anal spine slightly shorter than the third. In Burma the second anal spine is comparatively shorter than in Indian specimens. *Colour*—olive, with a dark mark composed of spots on the shoulder, being the remains of a band present in the young. The margins of the vertical fins are usually somewhat dark. In the *young*, termed by Buchanan *lala*, the fish is of a bright yellow or orange colour, with four or five dark vertical bands which are formed of fine black dots.

This species appears to vary more with age than any other species of *Ambassis*.

Hab. Throughout India and Burma; growing to a few inches in length.

630. (3.) **Ambassis baculis.**

Chanda baculis, *Ham. Buch. Fish. Ganges*, pp. 112, 371.
Ambassis baculis, *Day, Fish. India*, p. 51, pl. xv, fig. 1 (see synon.).

Kung-gi, Punj.; *Nga-koun-ma* or *Nga-zin-zat*, Burm.

D. 7 | 1/13. P. 12. A. 3/13. C. 17. L. r. 80.

Length of head 4, height of body 3 in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ from end of snout and also

apart. Lower jaw rather shorter than the upper. Preorbital strongly serrated along its lower edge, and having a sharp spine directed towards the orbit at its anterior-superior angle, followed by several more along its upper edge. The whole upper edge of the orbit generally serrated, but in some examples merely its posterior half. Vertical margin of preopercle entire, the whole lower edge of the horizontal limb strongly serrated, and a few serrations near the angle on the upper edge; sub- and interopercles entire. *Fins*—second spine of dorsal highest. Third anal spine slightly the longest; caudal forked, lower lobe slightly the longer. *Lateral line*—complete. *Colour*—yellowish olive; a golden spot on the occiput; black along the top of the first dorsal fin; second dorsal and anal darkest externally; front of each anal ray blackish; caudal dark along its base and also with blackish tips to each lobe.

Ambassis baculis principally differs from *A. nama* in its form being higher, the lower jaw shorter and not crooked to one side, in the vertical margin of the preopercle being strongly serrated, and in possessing no canine or enlarged teeth in the jaws.

Hab. Fresh waters of Orissa, Bengal, and as far north as the Punjab; also in Burma.

631. (4.) **Ambassis thomassi.**

Ambassis thomassi, *Day, P. Z. S.* 1870, p. 369; *Fish. India*, p. 52, pl. xv, fig. 2 (see synon.)

Mullu-cherú, Mal.; *Mullu-tharu*, Tel.; *Mullu-jubbu*, Canarese.

D. 7 | 1/10–12. P. 15. A. 3/9–10. C. 15. L. l. 35–41. L. tr. 7/17.

Length of head $3\frac{1}{3}$ to $4\frac{1}{2}$, height of body 3 to 4 in the total length. *Eyes*—diameter from 3 to $3\frac{1}{4}$ in length of head, $\frac{3}{4}$ from end of snout, and $\frac{1}{2}$ apart. Lower jaw the longer; a slight concavity over the orbits. Vertical margin of preopercle finely serrated, its lower double edge more coarsely so, especially at the angle; posterior half of lower edge of interopercle strongly serrated. Lower edge of preorbital denticulated; a raised usually serrated edge along its upper third. One spine at the posterior-superior angle of the orbit (becoming bifurcated with age), and the lower two thirds of its margin serrated (the serrations becoming blunted with age). *Teeth*—an outer rather enlarged row in both jaws, none on tongue. *Fins*—second dorsal spine longest; second anal spine equals the third. *Lateral line*—continuous. *Colour*—greyish, spotted with silvery; brownish basal spots on many of the scales, more especially along the back.

Hab. The coasts of Canara as low as Cochin; found some distance inland, even in elevated localities; attaining to at least $6\frac{1}{2}$ inches in length.

632. (5.) **Ambassis nalua.**

Chanda nalua, *Ham. Buch. Fish. Ganges*, pp. 107, 371, pl. 6, fig. 36.
Ambassis nalua, *Day, Fish. India*, p. 53, pl. xv, fig. 4 (see synon.).

Kyoung-ma-sah, Burm.

D. 7 | 1/10–11. P. 15. A. 3/9–10. C. 15. L. l. 26–28. L. tr. 3/12.

Length of head 4, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, nearly $\frac{1}{2}$ from end of snout, and 1 apart. Lower jaw the longer. Preorbital rather strongly serrated; two short spines directed backwards at the posterior-superior angle of the orbit. Vertical margin of preopercle entire, except a few serrations just above the angle, its double horizontal edge strongly serrated, also the posterior half of the lower border of the interopercle. *Teeth*—a narrow band along the middle of the tongue. *Fins*—dorsal spines strong, the second longest; second and third anal spines of the same length, and almost equal to the third of the dorsal fin. *Lateral line*—continuous. *Colour*—silvery, with a burnished lateral band; interspinous membrane dark between the second and third dorsal spines; a dark longitudinal band along either caudal lobe.

Hab. Calcutta in fresh and brackish water; Malabar coast and Andamans to the Malay Archipelago.

633. (6.) Ambassis interrupta.

Ambassis interrupta, *Bleeker, Batavia Nat. Tijdsch.* iii, 1852, p. 696; *Day, Fish. India*, p. 53, pl. xv, fig. 5 (see synon.).

D. 7 | 1/9–10. P. 13. A. 3/9–11. C. 18. L. l. 28. L. tr. 6/8.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and $\frac{3}{4}$ apart. Lower jaw the longer. Preorbital with both its upper and lower edges serrated. Anterior edge of orbit serrated, and two spines at its posterior-superior angle. Vertical margin of preopercle entire, the double edge of its horizontal limb serrated; interopercle with four denticulations at its angle. *Fins*—second dorsal spine longest; third anal spine slightly the longest. *Lateral line*—interrupted. *Colour*—silvery, with a narrow lateral band; second dorsal spine bright orange, the membrane between it and the third black; a dark longitudinal band along either caudal lobe.

As in other species of this genus, the comparative length of the highest dorsal spine varies with age.

Hab. Sea at the Andamans and Batavia.

634. (7.) Ambassis dayi.

Ambassis dayi, *Bleeker, Nat. Verh. d. Holland. Maats. d. Weten.* 3de *Verz.* Deel ii. no. 2, 1874, p. 95; *Day, Fish. India*, p. 54, pl. xv, fig. 7 (see synon.).

D. 7 | 1/10–11. P. 16. A. 3/10. C. 16. L. l. 30. L. tr. 4/—.

Length of head $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter 4 to $4\frac{1}{2}$ in length of head, $\frac{3}{4}$ to 1 from end of snout and also apart. Snout pointed, lower jaw the longer. Vertical margin of

preopercle minutely serrated, the lower limb serrated along both edges; interopercle serrated in its posterior half; subopercle entire. One spine at the posterior-superior angle of the orbit. *Fins*—second dorsal spine longest; second and third anal spines about equal in length, but the second is the stronger. *Lateral line*—continuous. *Colour*—silvery glossed with purple, a broad lateral burnished band; interspinous membrane between the second and third dorsal spines dark; second dorsal, anal, and caudal stained dark at their edges.

Hab. Malabar coast of India; attaining at least 7 inches in length.

635. (8.) Ambassis commersoni.

Ambassis commersonii, *Cuv. & Val. H. N. Poiss.* ii, p. 176, pl. 25; *Day, Fish. India*, p. 52, pl. xv, fig. 3 (see synon.).

D. 7|1/9–11. P.13. A.3/9–10. C.15. L.l.30–33. L.tr.4/9. Vert.9/15.

Length of head about 4, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout and also apart. Lower jaw the longer. Preorbital rather strongly serrated, the serration being directed downwards and slightly backwards. Vertical margin of preopercle entire, the lower double edge serrated, with two or three coarser teeth at the angle; lower margin of interopercle entire; in some rare cases, however, it has 2 or 3 badly marked serrations. *Teeth*—tongue usually with a narrow band along its centre. *Fins*—dorsal spines strong, transversely lineated, second the longest; second anal spine the strongest and nearly as long as the third, which almost equals the third of the dorsal. *Lateral line*—continuous. *Colour*—silvery, with purplish reflexions; a bright silvery line from the eye to the caudal fin; interspinous membrane between the second and third dorsal spines dark.

Hab. This common species extends from the Red Sea through the seas of India to North Australia; it ascends rivers and estuaries, attaining to 6 inches in length.

636. (9.) Ambassis myops.

Ambassis miops, *Günther, P. Z. S.* 1871, p. 655.
Ambassis myops, *Day, Fish. India, Suppl.* p. 784.

D. 7 | 1/9. P. 12. A. 3/9. C. 17. L. l. 29. L. tr. 4/9.

Length of head 4, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ from end of snout and the same apart. Lower jaw the longer. Preorbital with seven strong teeth along its lower edge; a spine at the posterior-superior angle of the orbit. Vertical margin of preopercle entire; its horizontal double edge serrated, the lower most coarsely. Sub- and interopercles entire. *Teeth*—a small central band at the root of the tongue. *Fins*—second dorsal spine longest; third anal spine longer and weaker than second, but half shorter than third dorsal spine. *Lateral line*—uninterrupted. *Colour*—silvery, with a burnished lateral band. Interspinous

membrane between the second and third dorsal spines spotted with black.

Hab. Madras, Malay Archipelago, and Cook's Islands.

637. (10.) Ambassis gymnocephalus.

Lutjanus gymnocephalus, *Lacép. H. N. Poiss.* iii, t. 23, fig. 3, and iv, p. 216.

Ambassis gymnocephalus, *Day, Fish. India*, p. 54, pl. xv, fig. 6 (see synon.).

Chandee, Ooriah.

D. 7 | 1/9–10. P. 15. A. 3/9–10. C. 17. L. l. 27–29. L. tr. 3/8.

Length of head 4 to 4½, height of body 3½ in the total length. *Eyes*—diameter dependent on age, in the young 2½, in the adult nearly 3 in the length of the head, ½ from end of snout and also apart. Lower jaw the longer. Preorbital with six or seven denticulations directed downwards and backwards on anterior-inferior edge, and a few serrations on posterior margin; double edge on inferior limb of the preopercle finely serrated, vertical margin entire. Sub- and interopercles entire. Two or three strong spines directed backwards at the posterior-superior angle of the orbit, and another rather larger posterior to them, occasionally a small spine on shoulder just before commencement of lateral line. *Teeth*—a band along the centre of the tongue. *Fins*—dorsal spines strong, the second nearly or quite as high as the third, or in a few cases a little longer, all the spines striated; the third anal spine is longer than the second, but not quite so strong, and equal to the fourth dorsal. *Lateral line*—interrupted after about eighth to twelfth scale, in some specimens it ceases entirely. *Colour*—silvery, with a bright longitudinal lateral band, some brown spots on the upper third of the body in its front half; blackish between its second and third dorsal spines, also a black edge to the caudal.

Hab. East coast of Africa, seas of India, Malay Archipelago, and China; attaining at least 4 inches in length. Although generally captured in the sea or saline backwaters, I obtained a specimen from the fresh water in the Cochin State several miles inland.

638. (11.) Ambassis urotænia.

Ambassis urotænia, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 257; *Day, Fish. India*, p. 55, pl. xv, fig. 8 (see synon.).

D. 7 | 1/9–10. P. 13. A. 3/9–10. C. 18. L. l. 27–28. L. tr. 3–4/10.

Length of head 4, height of body 3¼ in the total length. *Eyes*—diameter 2½ in length of head, ½ from end of snout, and ¾ apart. Lower jaw the longer. Preorbital with seven sharp teeth along its inferior edge, a spine at the posterior-superior angle of the orbit. Vertical margin of preopercle entire except two serrations just above its angle; the horizontal double edge serrated, the lower the more coarsely; sub- and interopercles entire. *Teeth*—a small

central band at the root of the tongue. *Fins*—second spine of the dorsal longest; third anal spine usually slightly the longest, but not equalling the longest of the dorsal. *Scales*—a single row along the suborbital ring of bones. *Lateral line*—curves downwards under the middle of the soft dorsal, but in an interrupted or semi-interrupted manner. *Colour*—silvery, with a burnished lateral band; the interspinous membrane between second and third dorsal spines black; a dark longitudinal band along either lobe of caudal.

Hab. Seychelles, Andamans, and the Malay Archipelago. This species nearly resembles *A. gymnocephalus*, but the lateral line is entire; there is only one row of scales along the suborbitals and the comparative height of its body differs. It appears to be common at the Andamans.

639. (12.) Ambassis thermalis.

Ambassis thermalis, *Cuv. & Val. H. N. Poiss.* iii, p. 493; *Day, Fish. India*, p. 746.

D. 7 | 1/9. A. 3/9.

Height of body not quite one third of the total length, excluding the caudal fin. *Scales*—large. *Colour*—greenish, with a silvery lateral band. A blackish longitudinal streak along each caudal lobe.

Hab. Warm springs of Cannia in Ceylon.

11. Genus **APOGON**, Lacép.

Syn. *Amia*, Gronovius; *Apogonichthys*, Bleeker; *Monoprion*, Poey; *Mionorus*, Krefft; *Archamia*, *Lepidamia*, and *Glossamia*, Gill; *Pristiapogon*, Klunz.

Branchiostegals seven; pseudobranchiæ present, usually well developed. Opercle not spiny. Preopercle with a double edge, either or both of which may be serrated, crenulated, or entire. Teeth villiform in the jaws, vomer, and palatines, without canines; tongue smooth. Two separate dorsal fins, the first with six or seven spines; the anal with two. Lateral line distinct and entire. Scales ctenoid, as a rule large and deciduous, but occasionally rather small. Cæcal appendages when present few.

Geographical Distribution. From the Red Sea and east coast of Africa, through the seas of India and Malay Archipelago to Australia, and even beyond. These small fishes are marine, and are numerous in sheltered spots, as inside harbours; some have been captured at the mouths of, or even a short distance up, tidal rivers and backwaters. They are most numerous off the Sind and Bombay coasts and the Andaman Islands, still they are by no means uncommon at Madras.

Uses. Although small, they are eaten fresh, dried, or salted by the natives of India.

Synopsis of Indian Species.

A. First dorsal with 7 spines.
- *a.* Lateral line with more than 30 scales; fins scarlet.
  - Body with many faint longitudinal bands .. 1. *A. multitæniatus*, p. 491.
  - Three dark longitudinal bands on side .... 2. *A. calosoma*, p. 492.
- *b.* Lateral line with less than 30 scales.
  - *a'.* Caudal fin forked.
    - Grey, several indistinct transverse dark bands; vertical fins black .... 3. *A. nigricans*, p. 492.
    - 3 or 4 longitudinal dark bands; both edges of interopercle serrated ...... 4. *A. frenatus*, p. 493.
    - Two black bands round body; 4th dorsal spine longest .... 5. *A. tæniatus*, p. 493.
    - Two black spots on side, one beneath 1st dorsal, the other at base of caudal. 6. *A. thurstoni*, p. 494.
    - Two longitudinal dark bands on each side .... 7. *A. quadrifasciatus*, p. 494.
    - Four longitudinal dark bands; inner edge of opercle not serrated .... 8. *A. fasciatus*, p. 494.
    - Olive, with 4 or 5 dark transverse bands; fins grey .... 9. *A. bandanensis*, p. 495.
    - Golden, head black; 4 white longitudinal bands .... 10. *A. wassinki*, p. 495.
    - Pinkish; a broad black band round root of tail .... 11. *A. aureus*, p. 496.
    - Grey, with 2 transverse dark bands; 3rd dorsal spine longest................ 12. *A. bifasciatus*, p. 497.
    - Golden; vertical fins with broad black bands.......................... 13. *A. ellioti*, p. 497.
    - Brown, with 4 rows of brown spots on sides .... 14. *A. maculosus*, p. 497.
  - *b'.* Caudal fin rounded or square.
    - Greyish, dorsal and anal black, caudal yellow with a black edge .... 15. *A. nigripinnis*, p. 498.
    - Yellowish green above, redder below; D. and C. with black edges............ 16. *A. glaga*, p. 498.
    - Spotted or marbled with brown throughout............................ 17. *A. auritus*, p. 499.

B. First dorsal with 6 spines; always a black spot at base of tail.
- *a.* Caudal rounded .... 18. *A. tickelli*, p. 499.
- *b.* Caudal forked.
  - *a'.* A. 2/14-27 .... 19. *A. lineolatus*, p. 499.
  - *b'.* A. 2/8-9.
    - A dark band from snout through eye to opercle or shoulder .... 20. *A. sangiensis*, p. 500.
    - No marks on head or side except caudal spot .... 21. *A. hyalosoma*, p. 500.
    - A single dark band round body........ 22. *A. orbicularis*, p. 500.
    - A dark lateral line from head to tail.... 23. *A. ceramensis*, p. 501.

640. (1.) Apogon multitæniatus.

Apogon multitæniatus (*Ehrenb.*), *Cuv. & Val. H. N. Poiss.* ii, p. 159; *Day, Fish. India*, pp. 57, 101, pl. xvi, fig. 1 (see synon.).

D. 7 | 1/9. P. 15. A. 2/8. C. 17. L. l. 37–38. L. tr. $3\frac{1}{2}$/12.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{3}{4}$ from end of snout, and $\frac{4}{5}$ apart. The outer edge of both vertical and horizontal margins of the preopercle finely and nearly evenly serrated; a small flat opercular spine. *Fins*—dorsal spines stout, the third and fourth the highest; second dorsal a little higher, its upper edge nearly straight; pectoral rounded; ventral not reaching the anal, which equals in height the second dorsal; caudal slightly emarginate. *Colour*—a slaty tinge along the back, becoming reddish on the head, sides, and abdomen; violet lines along the body, between the rows of scales, narrower than the ground-colour, most apparent after death. Fins scarlet; second dorsal, anal, and caudal with light edges and black tips; first dorsal black at the base and in the upper three fourths, also between last two spines. Eyes scarlet in their anterior halves, with some black markings.

Hab. Red Sea, seas of India to the Malay Archipelago.

641. (2.) Apogon calosoma.

Apogon kalosoma, *Bleeker, Batavia Nat. Tijdsch.* iii, 1852, p. 448; *Day, Fish. India*, p. 57, pl. xvi, fig. 2 (see synon.).

D. 7 | 1/9. P. 15. A. 2/8. C. 17. L. l. 35–36. L. tr. 3/13.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{2}{3}$ in length of head, $\frac{1}{2}$ from end of snout and also apart. Both vertical and horizontal margins of preopercle finely and evenly serrated along their outer edges. *Fins*—dorsal spines of moderate strength, the first two short, the third and fourth of nearly the same height, first spine of second dorsal two thirds as high as rays, and equal to longest in first dorsal; the caudal slightly emarginate. *Colour*—reddish, more especially over the head: three dark bands on each side, one from above the eye to upper portion of tail; a second from snout through the eye, and a large black spot at the base of the caudal fin to the end of the tail; a third from lower edge of eye to behind base of anal fin. Fins reddish, the front half of the first dorsal and the upper portion of its last half black, the remainder scarlet. A black band along the base of the second dorsal and anal; second dorsal, anal, and caudal scarlet with black tips.

Hab. Madras to the Malay Archipelago.

642. (3.) Apogon nigricans.

Apogon nigricans, *Day, Fish. India*, p. 58, pl. xvi, fig. 3.

D. 7 | 1/9. P. 13. A. 2/8–9. C. 17. L. l. 25–26. L. tr. 2/7.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter 3 in length of head, 1 from end of snout, and $\frac{3}{4}$ apart. Both vertical and horizontal margins of preopercle finely serrated on their outer edges, shoulder also serrated. *Fins*—dorsal spines rather weak, the first two short, third nearly as long as fourth.

Spine of second dorsal much higher than third of first dorsal and rays much more elevated than spine; pectoral and ventral both reach as far as anal, the rays of which are as long as those of the dorsal; caudal notched. *Lateral line*—nearly straight. *Colour*—greyish shot with yellow, several badly-marked vertical dark bands on the body and the free portion of the tail. Head covered with dark brown spots, some of which have a light centre; opercles with purplish reflexions. The whole body finely spotted with brown. Vertical fins black; pectoral with a dark base.

Hab. Madras.

643. (4.) Apogon frenatus.

Apogon frenatus, *Val. Nouv. Ann. Mus. Hist. Nat.* i, 1832, p. 57, pl. iv, fig. 4; *Day, Fish. India*, p. 58, pl. xvi, fig. 4 (see synon.).

D. 7 | 1/9. P. 16. A. 2/8. C. 17. L. l. 27–28. L. tr. 2/7.

Length of head $3\frac{1}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{1}{2}$ from end of snout, and $\frac{3}{4}$ apart. Both inner and outer edges of preopercle serrated, also some serrations along the lower edge of the orbit; a small opercular spine. *Fins*—third dorsal spine nearly as long as fourth, which is the highest; caudal notched. *Colour*—reddish, a dark band from eye to middle of caudal; a narrower one from upper edge of the orbit to the upper part of the tail; a third from below the eye to the lower portion of the tail. A black band along the bases of the second dorsal and anal; dorsal, caudal, ventrals, and anal black-tipped. A black spot sometimes at base of caudal fin.

Hab. Mauritius, seas of India, the Malay Archipelago, and beyond.

644. (5.) Apogon tæniatus.

Apogon tæniatus (*Ehrenb.*), *Cuv. & Val. H. N. Poiss.* ii, p. 159; *Day, Fish. India*, p. 59, pl. viii, fig. 4 (see synon.).

D. 7 | 1/9. P. 15. A. 2/8. C. 17. L. l. 27. L. tr. 2/8.

Length of head $3\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, nearly 1 from end of snout, and $\frac{3}{4}$ apart. Outer edges of both vertical and horizontal limbs of preopercle and the shoulder-bone serrated; orbit entire. A flat opercular spine. *Fins*—first dorsal spines rather strong, the fourth the longest; soft dorsal much higher than spinous; ventral reaching the anal; caudal forked. *Colour*—reddish brown shot with gold; two black bands round body, one through bases of first 3 dorsal spines and axil of pectoral fin, the second through middle of second dorsal and commencement of anal; a black spot near end of lateral line; inner third of ventral nearly black; a dark band across soft dorsal fin.

Hab. Red Sea and Madras.

645. (6.) Apogon thurstoni.

Apogon thurstoni, *Day, Fish. India, Suppl.* 1888, p. 784.

D. 7 | 1/9. P. 14. A. 2/7. C. 17. L. l. 26. L. tr. $2/6\frac{1}{2}$.

Length of head $3\frac{1}{4}$, height of body $2\frac{4}{5}$ in the total length. *Eyes*—diameter $3\frac{2}{3}$ in length of head, $\frac{3}{4}$ from end of snout, and 1 apart. Snout a little elevated. Both borders of preopercle serrated, and the shoulder scale serrated. *Fins*—dorsal spines strong, the third slightly the longest; rays of second dorsal as long as longest dorsal spine and one fourth longer than those of the anal fin. Pectoral reaches to above anal, and the ventral nearly as far. Caudal somewhat square. *Colour*—greyish, darkest along the back, a dark band behind the base of the second dorsal fin; an oval black spot nearly as large as the orbit and surrounded by a narrow yellow ring below the lateral line under the first dorsal. Vertical fins black, caudal yellowish.

Hab. Madras.

646. (7.) Apogon quadrifasciatus.

Apogon quadrifasciatus, *Cuv. & Val. H. N. Poiss.* ii, p. 153; *Günther, Catal.* i, p. 239; *Day, Fish. India*, p. 59 (see synon.).

D. 7 | 1/9. P. 14. A. 2/8. C. 17. L. l. 26. L. tr. 2/6.

Length of head $3\frac{1}{3}$, height of body $3\frac{2}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ in length of head, $\frac{3}{4}$ from end of snout and also apart. Outer edges of vertical and horizontal limbs of preopercle rather strongly serrated, inner edges entire. *Fins*—dorsal spines moderate, third about the same height as the fourth and fifth, and two thirds of that of the rays; soft portion of the fin with its upper edge cut square or slightly emarginate; ventral reaches anal; caudal emarginate. *Colour*—a broad brown band from the snout through the eye, continued to the end of the caudal fin; another from the upper edge of the eye to above the tail. A badly developed basal band along soft dorsal and another on anal fin; no black spot at base of caudal.

Hab. Seas of India, Malay Archipelago, and beyond.

647. (8.) Apogon fasciatus.

Mullus fasciatus, *White, N. S. Wales*, p. 268, fig. 1.
Apogon fasciatus, *Day, Fish. India*, p. 60.
Apogon endekatænia, *Day, Fish. India*, p. 59, pl. xvi, fig. 7 (not *Bleeker*) (see synon.).

Bakor, Maráthi.

D. 7 | 1/9. P. 13. A. 2/8. C. 17. L. l. 25. L. tr. 2/6.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to $3\frac{1}{3}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ from end of snout and the same apart. Outer edge of preopercle serrated along both margins, intramarginal crest entire; shoulder serrated. *Fins*—dorsal spines

rather stout, third longest, and nearly as high as the rays: soft portion of fin with upper edge oblique; the ventral does not reach the anal; caudal emarginate. *Colour*—reddish brown, with four lateral longitudinal bands, the third commencing at the snout passes through the eye to the centre of the caudal fin, this band is usually edged below by a narrow white one commencing at the pupil of the eye. The second and fourth bands also extend to the caudal fin. A dark band runs along the first dorsal fin, and is continued along the middle or base of the second dorsal; the anal has also a basal band.

Hab. Seas of India, Malay Archipelago, and beyond.

648. (9.) Apogon bandanensis.

Apogon bandanensis, *Bleeker, Batavia Nat. Tijdsch.* vi, 1854, p. 95.
Apogon savayensis, *Gunther, P. Z. S.* 1871, p. 656; *Day, Fish. India*, pp. 60, 101, pl. xvi, fig. 5 (see synon.).
Apogon bankanensis, *Day, Fish. India*, p. 101.

D. 7 | 1/9. P. 12. A. 2/8. C. 17. L. l. 26. L. tr. 2/6.

Length of head $3\frac{1}{4}$, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{3}$ from end of snout, and $\frac{1}{2}$ apart. Vertical and horizontal margins of preopercle serrated on their outer edges. *Fins*—dorsal spines weak, the 3rd not so high as the 4th. The pectoral reaches the anal, as does also the ventral; caudal slightly notched. *Colour*—olive, with four or five narrow dark vertical bands from first dorsal and first half of second dorsal descending to the abdomen; a dark band, three scales wide, over free portion of tail, only reaching half a scale below lateral line. A black streak from lower edge of eye to angle of preopercle; numerous small brown spots on head and also on body, especially above lateral line. Fins grey, anterior half of first dorsal black; caudal with a dark edge externally margined with white.

Hab. Red Sea, coast of Africa, seas of India and beyond; attaining at least 3 inches in length.

649. (10.) Apogon wassinki.

Apogon wassinki, *Bleeker, Batavia Nat. Tijdsch.* xxii, 1860, p. 258; *Day, Fish. India*, p. 61 (see synon.).

D. 7 | 1/9. P. 14. A. 2/8. C. 17. L. l. 25–26. L. tr. 2/7.

Length of head $3\frac{3}{4}$ to $3\frac{1}{2}$, height of body $3\frac{1}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{3}$ to $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout and also apart. Vertical and horizontal borders of preopercle serrated on their outer edges. *Fins*—third and fourth dorsal spines the longest, and $\frac{1}{5}$ less than the longest ray; upper edge of first dorsal slightly emarginate. Ventral nearly reaching the anal. Anal rays similar to those of soft dorsal. Caudal lobed. *Colour*—brilliant golden with a black head. A silvery-white median band along the top of the head; it divides, one branch proceeding along the back on either side to the upper half of the tail;

a second band from above the orbit to the middle of the tail; a third through the orbit to the lower half of the tail; and a fourth from the angle of the mouth to below the base of the pectoral. Fins orange.

This fish is very common amongst the coral-reefs on the Andaman Islands. The largest specimen I obtained was only a little above $1\frac{1}{2}$ inches in length. It may be the young of *A. cyanosoma*, Bleeker.

Hab. Andamans and Nicobars.

650. (11.) **Apogon aureus.** (Fig. 150.)

Centropomus aureus, *Lacép. H. N. Poiss.* iv, pp. 253, 273.
Apogon aureus, *Day, Fish. India*, p. 61, pl. xvi, fig. 8 (see synon.).

D. 7 | 1/9. P. 14. A. 2/8. C. 17. L. l. 25–26. L. tr. $2\frac{1}{2}/6$. Cæc. pyl. 4.

Length of head $3\frac{1}{2}$, height of body 3 to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head, $\frac{1}{2}$ from end of snout, and $\frac{3}{4}$ apart. Outer edges of vertical and horizontal margins of preopercle serrated. *Fins*—dorsal spines rather slender, 3rd not quite so long as 4th; soft portion of fin highest, and cut square or even slightly emarginate, especially in large specimens; caudal

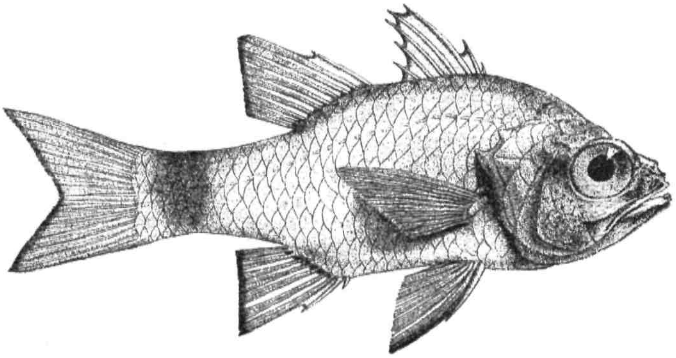

Fig. 150.—*Apogon aureus.*

emarginate. *Colour*—body pinkish shot with gold; a rather broad, black band at root of caudal fin over free portion of tail; some minute black spots around jaws, on upper portions of opercles, and on crown of head. Fins reddish, first dorsal black-tipped; ventral spine and outer ray black, and a narrow black edge to second dorsal, anal, and caudal. The variety *A. roseipinnis* has a violet band along the base of the anal fin.

Hab. Red Sea, east coast of Africa, the seas of India and Malay Archipelago. Very common at Madras up to 5 or 6 inches in length; in June and July they are usually abundant.

651. (12.) Apogon bifasciatus.

Apogon bifasciatus, *Rüppell, N. W., Fische*, p. 86, t. 22, fig. 2; *Day, Fish. India*, p. 62, pl. xvi, fig. 9, *Suppl.* p. 784 (see synon.).

D. 7 | 1/9. P. 15. A. 2/8. L. l. 25. L. tr. 2/7$\frac{1}{2}$. Cæc. pyl. 3 (4 Kner).

Length of head 3$\frac{1}{4}$ to 3$\frac{1}{2}$, height of body 2$\frac{3}{4}$ in the total length. *Eyes*—diameter 2$\frac{3}{4}$ of length of head, $\frac{1}{3}$ from end of snout, and $\frac{2}{3}$ apart. Outer edge of vertical margin of preopercle distinctly, of horizontal margin indistinctly serrated. *Fins*—dorsal spines strong, the third and fourth of about the same height. The pectoral reaches to above the anal; caudal emarginate in the adult, more rounded in the young. *Colour*—slaty grey with bronze reflexions; 2 dark vertical bands, one from the first half of the dorsal fin to below the pectoral fin, and a similar band from the first half of the second dorsal; a black spot at the root of the caudal. Fins, except the pectoral, blackish, or with black edges, due to fine black points, which are also spread over the jaws, head, and very finely over the body.

Hab. Red Sea, seas of India, Malay Archipelago and China. Very common at Madras up to 6 inches in length. Klunzinger (Fisch. Roth. Meer. p. 21) considers this species to be merely a form of *A. tæniatus*; but the latter has a much lower first dorsal fin, and it would be well to obtain a series.

652. (13.) Apogon ellioti.

Apogon ellioti, *Day, Fish. India*, p. 63, pl. xvii, fig. 1, *Suppl.* p. 784.

D. 7 | 1/9. P. 15. A. 2/8. C. 16. L. l. 26. L. tr. 2/6$\frac{1}{2}$.

Length of head 3$\frac{1}{4}$, height of body 3$\frac{1}{2}$ in the total length. *Eyes*—diameter 3$\frac{1}{2}$ in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ from end of snout, and 1 apart. Vertical border of preopercle entire, or very finely serrated on its lower half and outer edge, more distinctly round the angle and on the outer edge of the horizontal border, there may also be a few serrations along the inner angle. *Fins*—spinous much lower than soft dorsal, 3rd, 4th, and 5th spines the highest; upper edge of second dorsal and of anal rounded. Pectoral as long as ventral, which does not reach the anal; caudal rounded. *Colour*—golden; upper surface of head and jaws, also upper portion of opercle, with black spots; a greyish band along side, terminating in the young in an indistinct lateral blotch on the tail. First dorsal white, its upper half deep black; second dorsal yellow, with a black band along the centre and a black outer edge; anal likewise with a black median band; caudal grey, with a white band margined with black, and an external white edge.

Hab. East coast of Africa, Madras, and seas of India, China, and Japan; attaining to a little over 4 inches in length.

653. (14.) Apogon maculosus.

Apogon maculosus, *Cuv. & Val. H. N. Poiss.* vi, p. 493; *Day, Fish. India*, p. 64 (see synon.).

D. 7 | 1/8. A. 2/7.

Colour—brown, darkest anteriorly, having four rows of brown spots along either side, but none on the head. Fins brown, spotted with black.

Hab. This fish is said to have come from the seas of India, whence M. de Ketlitz, a Russian naturalist, brought figures (? specimens); from him Cuvier and Valenciennes obtained their information. It is stated to attain 3 inches in length.

654. (15.) Apogon nigripinnis.

Apogon nigripinnis, *Cuv. & Val. H. N. Poiss.* ii, p. 152; *Day, Fish. India*, p. 60, pl. xvi, fig. 6 (see synon.).

D. 7 | 1/9. P. 15. A. 2/8. C. 17. L. l. 26. L. tr. $2\frac{1}{2}/6\frac{1}{2}$.

Length of head 3 to $3\frac{1}{4}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{4}$ in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ from end of snout, and $\frac{3}{4}$ apart. Vertical and horizontal limbs of preopercle strongly and evenly serrated along their outer edges; shoulder-bone serrated. *Teeth*—an outer slightly enlarged row in each jaw. *Fins*—dorsal spines strong, and 3rd not so high as 4th. Pectoral does not reach anal, but ventral does; caudal rounded. *Colour*—greyish, a dark vertical band from in front of base of first dorsal passes backwards and downwards, increasing in width to behind pectoral fin; a second from base of second dorsal to lateral line, and a third over free portion of tail. No black spots or streaks on the head, vertical fins black except the caudal, which is yellow and has a dark edge.

Hab. Madras, where it is common; growing to at least $3\frac{2}{10}$ inches in length.

655. (16.) Apogon glaga.

Apogon glaga, *Bleeker, Batav. Genootsch. Verhand.* xxii, *Perc.* p. 29; *Day, Fish. India*, p. 62, pl. xvi, fig. 10 (see synon.).

D. 7 | 1/9. P. 16. A. 2/8. C. 17. L. l. 24–25. L. tr. 2/7.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and 1 apart. Both borders of preopercle entire, outer edge of horizontal limb somewhat crenulated, its outline sinuous. *Teeth*—outer row in maxilla rather enlarged, and a few canine-like in mandible; those in the vomer and palate in a single row and rather larger-sized than in the jaws. *Fins*—dorsal spines weak, the fourth the highest; soft dorsal fin considerably higher than spinous. Pectoral reaches to above anal. Caudal rounded. *Colour*—yellowish green above, more roseate along the abdomen; a dark band between the orbits. Edges of scales with minute black dots, forming horizontal lines, most distinct along the back; each scale in the second and third rows have a pearly-white spot at the base. Upper half of first dorsal black; second dorsal and caudal black-edged. A

moderately wide band along the middle of the second dorsal, which appears to be sometimes spotted with blue.

Hab. Madras, growing to $3\frac{2}{5}$ inches in length; Malay Archipelago.

656. (17.) Apogon auritus.

Apogon auritus, *Cuv. & Val. H. N. Poiss.* vii, p. 443; *Day, Fish. India*, p. 63, pl. xvii, fig. 2 (see synon.).

D. 7 | 1/9. P. 12. A. 2/7-8. C. 17. L. l. 23-24. L. tr. 2/6.

Length of head 3, height of body $3\frac{1}{2}$ to 4 in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in the length of head, $\frac{1}{2}$ to $\frac{1}{3}$ from end of snout and also apart. Edges of all bones of the head and shoulder entire. *Fins*—3rd and 4th dorsal spines the highest, and three fourths as high as the rayed fin. Ventral reaches two thirds of the way to the anal. Caudal rounded or cut rather square. *Lateral line*—either ceases under middle of soft dorsal, or reappears lower down, going direct to centre of base of caudal. *Colour*—body and head spotted and marbled all over with brown. A circular black spot on the opercle enclosed by a narrow white ring, which is present even in the fry.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago and beyond.

657. (18.) Apogon tickelli.

Apogon tickelli, *Day, Fish. India, Suppl.* p. 785 (see synon.).

D. 6 | 1/10. P. 13. A. 2/8. C. 15. L. l. 24 (26). L. tr. 3/8.

Length of head 3 to $3\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, nearly 1 from end of snout, and $\frac{3}{4}$ to 1 apart. The posterior edge of the preopercle finely serrated. *Fins*—first dorsal spine one third the length of the second, which is equal to the third; second dorsal fin somewhat higher than first. Caudal rounded. *Colour*—pale horn above and below, with a slight golden tinge on the opercles; caudal and ventral both having a dark hinder edge. A round black spot at root of caudal.

Hab. Col. Tickell procured two examples at Akyab.

658. (19.) Apogon lineolatus.

Apogon lineolatus (*Ehr.*), *Cuv. & Val. H. N. Poiss.* ii, p. 160.
Apogon macropterus (*K. & v. H.*), *Cuv. & Val. H. N. Poiss.* ii, p. 160; *Day, Fish. India*, p. 64, pl. xvii, fig. 4 (see synon.).

D. 6 | 1/9. A. 2/14-17. C. 17. L. l. 22-26. (C. pyl. 0, Cantor.)

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in length of head, $\frac{1}{2}$ from end of snout and apart. Outer edge of vertical and horizontal limbs of preopercle finely serrated. *Fins*—dorsal spines weak, the 3rd the highest. The pectoral reaches to above the 3rd or 4th anal ray;

caudal forked. *Colour*—whitish, with a pink tinge, fins pinkish; a round black spot at base of caudal fin.

Hab. East coast of Africa, seas of India and Malay Archipelago, very common at Madras. Length in India not more than 3 or 4 inches.

659. (20.) Apogon sangiensis.

Apogon sangiensis, *Bleeker, Batavia Nat. Tijdsch.* xiii, p. 375; *Day, Fish. India*, p. 64, pl. xvii, fig. 3 (see synon.).

D. 6 | 1/9. P. 13. A. 2/8-9. C. 17. L. l. 24-25. L. tr. $1\frac{1}{2}/7$.

Length of head 3 to $3\frac{1}{3}$, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ from end of snout and apart. Outer edge of both vertical and horizontal limbs of preopercle very finely serrated. *Fins*—dorsal spines very weak, the third generally the longest. Ventral almost reaches the anal; caudal notched. *Colour*—golden tinged with red; a wide brown band from snout, through eye, ending on posterior edge of opercle, or else in a black spot a little below the shoulder; a round black spot on side close to base of caudal; a minute black spot on back, close behind base of last dorsal ray. Upper half of first dorsal black. The anal fin is said to be sparingly spotted with blue in specimens from the Malay Archipelago.

Hab. Andamans to the Malay Archipelago.

660. (21.) Apogon hyalosoma.

Apogon hyalosoma, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 63; *Day, Fish. India*, p. 64, pl. xvii, fig. 5 (see synon.).

D. 6 | 1/9. P. 12-14. A. 2/8. C. 17. L. l. 24-25. L. tr. $2\frac{1}{2}/8\frac{1}{2}$.

Length of head 3 to $3\frac{1}{4}$, height of body 3 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to $3\frac{2}{3}$ in length of head, $\frac{3}{4}$ from end of snout, and 1 apart. Both borders of preopercle serrated along their outer edges. *Fins*—dorsal spines of moderate strength, the second and third about the same length and highest, but not so high as the soft dorsal. Pectoral rather longer than ventral, which reaches two thirds of distance to base of anal; soft anal as high as soft dorsal; caudal lobed. *Colour*—olive, with a darkish blotch at the base of the caudal fin; blackish between the second and third dorsal spines; fins grey.

Hab. Seas of India and Malay Archipelago; attaining at least 6 inches in length.

661. (22.) Apogon orbicularis.

Apogon orbicularis (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* ii, p. 155; *Day, Fish. India*, p. 65, pl. xviii, fig. 7 (see synon.).

D. 6 | 1/8-9. P. 12. A. 2/8-9. C. 17. L. l. 24-26. L. tr. $2\frac{1}{2}/7$.

Length of head $3\frac{1}{2}$, height of body $2\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head, $\frac{1}{2}$ to $\frac{2}{3}$ from end of snout, and $\frac{3}{4}$ apart. The outer edges of both margins of the preopercle

serrated, also the shoulder-bone. *Fins*—second dorsal spine highest and about equal to rays in second dorsal. Ventrals reach anal, the rays of which are similar to those of the soft dorsal. Caudal forked. *Colour*—olive-brown, a dark zone round the body from in front of the first dorsal fin, and behind the ventral. Head spotted black. A cloudy band below the second dorsal; free portion of the tail with some black spots and blotches. First dorsal with some dark spots; ventral nearly black.

Hab. Andamans, Malay Archipelago and beyond.

662. (23.) Apogon ceramensis.

Apogon ceramensis, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 256; *Day, Fish. India,* p. 65, pl. xvii, fig. 6 (see synon.).

D. 6 | 1/9. P. 14. A. 2/9. C. 17. L. l. 23–25. L. tr. 2/7.

Length of head $3\frac{1}{4}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—$3\frac{1}{3}$ diameters in length of head, $\frac{3}{4}$ from end of snout, and $\frac{2}{3}$ apart. Both borders of preopercle serrated along their outer edges. *Fins*—third dorsal spine slightly the highest, ventral does not reach anal. Caudal notched. *Colour*—greenish brown, with some dark spots on the head; a narrow blackish-brown band from the head to the root of the caudal fin, where it ends in a round black blotch; in its anterior half it is bordered on either side by a bluish-white streak, which gradually decreases in width; there is a brownish blotch on the shoulder. The membrane between the second and third dorsal spines is black.

Hab. Nicobars and Malay Archipelago.

12. Genus CHILODIPTERUS (Lacép.), Cuv. & Val.

Syn. *Paramia,* Bleeker.

Branchiostegals seven; pseudobranchiæ well-developed. Opercles spineless; preopercle with a double edge, both, or the outer only, serrated. Villiform teeth in jaws, vomer, and palate; canines present generally in both jaws, and lateral teeth like canines. Two dorsal fins separated by an interspace, the first with six spines, the anal with two. Caudal forked. Scales ctenoid, large and deciduous. Lateral line distinct.

Geographical Distribution. Indian and Pacific Oceans. Abundant off Sind and the Andamans and Nicobars.

Synopsis of Indian Species.

Seven or 8 narrow black longitudinal bands .	1. *C. macrodon,* p. 501.
Four or 5 bands	2. *C. quinquelineatus,* p. 502.
Fourteen to 16 bands	3. *C. lineatus,* p. 502.

663. (1.) Chilodipterus macrodon.

Centropomus macrodon, *Lacép. H. N. Poiss.* iv, p. 273.

Cheilodipterus lineatus, *Day, Fish. India,* p. 66, pl. xviii, fig. 8 (*not Forsk.*).

Cheilodipterus macrodon, *Day, Fish. India, Suppl.* p. 785 (see synon.).

D. 6 | 1/9. P. 13. A. 2/8. C. 17. L. l. 26–27. L. tr. $3\frac{1}{2}/7\frac{1}{2}$.

Length of head above 3, height of body 4 in the total length. *Eyes*—diameter from 4 to $4\frac{1}{4}$ in length of head, 1 to $1\frac{1}{4}$ from end of snout, and $\frac{3}{4}$ to 1 apart. Outer edge of vertical and horizontal margins of preopercle serrated, the former more finely; other bones of head entire. *Fins*—dorsal spines weak, second and third equal to each other and to two thirds the height of the body. *Colour*—silvery red, with about seven horizontal black bands along the head and body, but the number appears to increase with age, and in adults intermediate bands appear between those existing in the young. One black band from above the snout to the base of the dorsal. A black spot surrounded by a light edge at base of caudal. Fins red, the first dorsal black between second and third spines.

Hab. Red Sea, east coast of Africa, seas of India, Andamans, Malay Archipelago and beyond.

664. (2.) **Chilodipterus quinquelineatus.**

Chilodipterus quinquelineatus, *Cuv. & Val. H. N. Poiss.* ii, p. 167; *Day, Fish. India,* p. 66 (see synon.).

D. 6 | 1/9. V. 1/5. A. 2/9. C. 17. L. l. 25. L. tr. 2/7.

Length of head about $3\frac{1}{2}$, height of body $4\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ from end of snout and also apart. Vertical border of preopercle serrated along its outer edge. *Fins*—dorsal spines weak, second and third of same height, and about half that of body. *Colour*—reddish, with five black bands along the head and side; a black spot surrounded by a yellow ocellus at root of caudal fin.

Hab. Red Sea, seas of India, and Malay Archipelago.

665. (3.) **Chilodipterus lineatus.** (Fig. 151.)

Perca lineata, *Forsk. Descr. Anim.* p. 42, no. 43.
Cheilodipterus lineatus, *Day, Fish. India,* pl. xviii, fig. 9, p. 785 (see syron.).

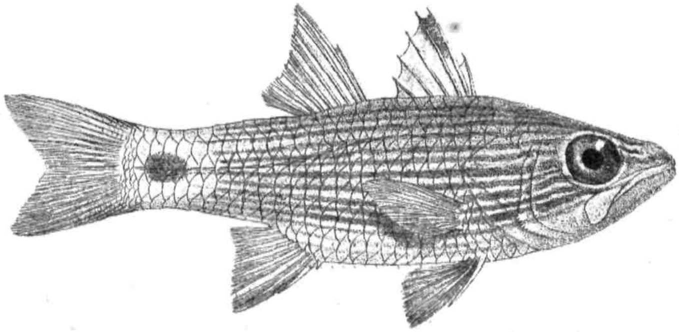

Fig. 151.—*Chilodipterus lineatus.*

Similar to last but with 14 to 16 longitudinal bands, and a black blotch at side of tail.

Hab. Same as the last.

Fifth group. GRYSTINA.

13. Genus DULES, Cuv. & Val.

Syn. *Moronophis* and *Plectroplites*, Gill; *Paradules*, pt., Bleeker.

Branchiostegals six; pseudobranchiæ. Preopercle serrated Opercle with spines. Villiform teeth in the jaws, vomer, and palatines; no canines. A single dorsal fin with ten spines; anal with three. Scales ctenoid and of moderate size.

Geographical Distribution. Intertropical seas, some species being said to enter fresh waters.

Uses. Owing to their small size, these fishes are of but little economic value.

Synopsis of Indian Species.

A dark band across caudal.................... 1. *D. marginatus*, p. 503.
Two oblique bands across each lobe of caudal.. 2. *D. argenteus*, p. 504.

666. (1.) Dules marginatus. (Fig. 152.)

Dules marginatus, *Cuv. & Val. H. N. Poiss.* iii, p. 116, pl. 52, *and* vii, p. 474; *Day, Fish. India*, p. 67, pl. xviii, fig. 1 (see synon.).

D. 10/11. P. 15. A. 3/10. C. 17. L. l. 42. L. tr. 5/8.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 from end of snout and also apart. *Fins*—dorsal spines moderately strong, the fifth the highest, tenth longer than ninth; third anal spine the longest; caudal moderately forked. *Colour*—back greyish, sides and abdomen silvery white; a dark grey band across the posterior third of the

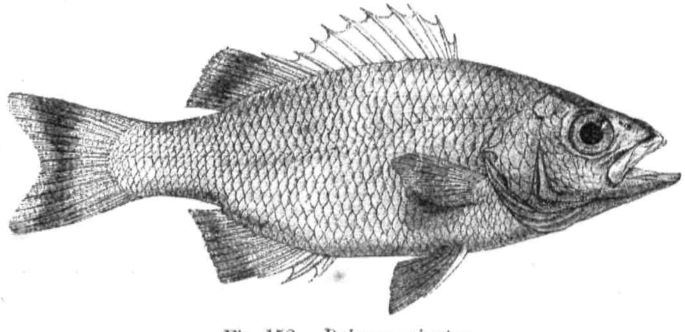

Fig. 152.—*Dules marginatus.*

caudal fin, the border of which is white; a similar but darker band, with a white upper edge, along the soft dorsal; the other fins tinged externally with grey and edged with white.

Hab. Seas of India, the Malay Archipelago and beyond; attaining at least 8 inches in length.

667. (2.) Dules argenteus.

Perca argentea, *Bennett, Fish. Ceylon*, p. 22, pl. 22.
Dules argenteus, *Day, Fish. India*, p. 67, pl. xviii, fig. 2 (see synon.).

D. 10/9–10. P. 15. A. 3/10–11. C. 17. L. l. 52. L. tr. 6/12.

Length of head nearly 4, height of body $3\frac{3}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and $\frac{3}{4}$ apart. *Fins*—dorsal spines not very strong, fifth and sixth the highest; second anal spine slightly shorter but stronger than third; caudal forked. *Colour*—bluish, becoming silvery white on the sides and abdomen; soft dorsal greyish black along its upper third and with a white outer margin; caudal milk-white, with two oblique yellowish-black bands on each lobe and a narrow central black longitudinal one.

A young specimen $1\frac{1}{2}$ inches long is blue with two narrow black lines on each side, one at the base of the dorsal fin, the other a little below; anal and dorsal black-tipped.

Hab. East coast of Africa, seas of India, the Malay Archipelago and beyond; attaining 6 inches or more in length.

Sixth group. THERAPONINA.

14. Genus THERAPON, Cuv.

Syn. *Pelates*, sp., Cuv.; *Datnia*, Cuv. & Val.

Branchiostegals six; pseudobranchiæ. Eyes of moderate size. Opercle with spines. Preopercle, and sometimes preorbital, serrated. Teeth villiform in both jaws, the outer row sometimes the larger; deciduous teeth on the vomer and palatines. Dorsal fin single, but more or less notched, having from 11 to 13 spines; anal with three. Scales of moderate or small size. Air-bladder divided by a constriction. Pyloric appendages few or in moderate numbers.

Geographical Distribution. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and Australia. These fishes in India are marine, but some are occasionally found in brackish water within tidal influence; they may even live temporarily in brackish or even freshwater ponds.

Uses. Species of this genus are not esteemed as food, as they are reputed to feed on carrion, but they are eaten by the poorest class of natives.

The colour of these fish is usually silvery, with longitudinal bands; but in some species cross bands are present in the immature.

Synopsis of Indian Species.

A. Dark oblique bands on caudal fin.
- L. l. 90–100. Lateral bands straight, no mark on anal .... 1. *T. puta*, p. 505.
- L. l. 80–90. Lateral bands curved .... 2. *T. jarbua*, p. 505.
- L. l. 50–55. Lateral bands straight, a black mark on anal .... 3. *T. theraps*, p. 506.

B. No oblique bands on caudal.
L. l. 70. Second anal spine much shorter than dorsal spines .... 4. *T. quadrilineatus*, p. 507.
L. l. 56. Second anal spine longer and stronger than dorsal spines .... 5. *T. argenteus*, p. 507.

668. (1.) Therapon puta.

Therapon puta, *Cuv. & Val. H. N. Poiss.* iii, p. 131; *Day, Fish. India*, p. 68, pl. xviii, fig. 3 (see synon.).

Kove keetchan, Tam. (Madras); *Keelputa*, Tel.; *Keetchan*, Tam. and Mal.

D. 11–12/10. P. 15. A. 3/8–9. L. l. 90–100. L. tr. 13–14/24. C. pyl. 7.

Length of head 4 to $4\frac{1}{3}$, height of body 4 in the total length. *Eyes*—diameter $3\frac{1}{3}$ to $3\frac{2}{3}$ in length of head, 1 from end of snout, and $\frac{2}{3}$ apart. Preopercle with five or six strong denticulations on its vertical border, the two lower larger than the upper; the serrations are continued along the horizontal border. *Teeth*—jaws with an outer enlarged row. *Fins*—dorsal spines rather slender, the fourth to the sixth about equal and longest; second anal spine a little shorter than the third; caudal emarginate. *Colour*—greyish, with three or four longitudinal straight blackish-brown bands: upper three quarters of dorsal blackish between the 3rd or 4th and 7th or 8th spines. Two dark oblique bands across the upper caudal lobe, and one, sometimes two, across the lower one. The *young* are similar to the adult, except that they look as if light spots were present between the first three horizontal bands.

Hab. Seas of India to the Malay Archipelago.

669. (2.) Therapon jarbua. (Fig. 153.)

Sciæna jarbua, *Forsk. Descr. Anim.* p. 50, no. 57.
Therapon jarbua, *Day, Fish. India*, p. 69, pl. xviii, fig. 4 (see synon.).

Palin keetchan, Tam.; *Gahnu*, Ooriah; *Nga-sabasa-sa*, "Paddy-eating fish," Arrac.; *Boorgooni* and *Jeerpye*, Bengali, Chittagong.

D. 10–12/9–10. A. 3/8–9. L. l. 80/90. L. tr. 15/30. Vert. 10/15.

Length of head from $3\frac{2}{3}$ to 4, height of body $3\frac{1}{2}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 from end of snout and also apart. Preorbital serrated in the hinder two thirds of its lower edge. Vertical limb of preopercle with from 12 to 14 serrations, the two at its rounded angle being much the strongest, along the lower limb are about eight weaker ones. Upper opercular spine small, the lower large and strong. Sub- and interopercles, shoulder-bone, and bone in the axilla serrated. *Teeth*—an outer somewhat enlarged row in the jaws. *Fins*—dorsal spines moderately strong, the 3rd and 4th the longest; 2nd anal spine usually the strongest, and slightly shorter than the 3rd; caudal forked. *Colour*—back bluish grey, becoming white on the abdomen, a tinge of gold along the cheeks and snout. Three longitudinal reddish-brown bands, having a slight convexity down-

wards on each side. Sometimes there is a fourth band along the abdomen. Ventral and anal with a yellow tinge along their centres. Dorsal interspinous membrane milk-white, with a black mark in its upper two thirds between the 3rd and 6th spines; a second commences at the 8th spine, and is continued along the

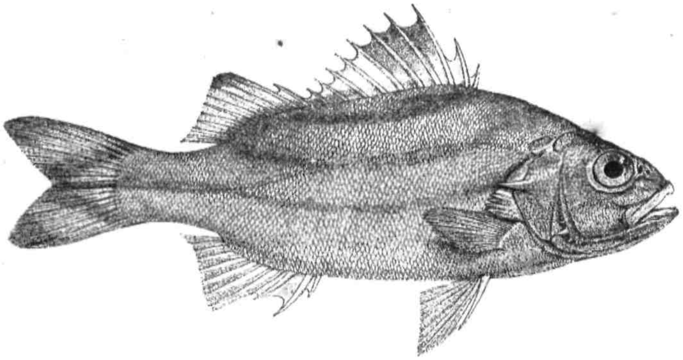

Fig. 153.—*Therapon jarbua.*

base of the soft dorsal; upper edge of first three dorsal rays tipped with black; caudal with two oblique bands across each lobe; eye yellowish red.

Hab. Red Sea, east coast of Africa, the seas and estuaries of India, the Malay Archipelago, and north coast of Australia. A common fish, attaining 12 or 13 inches in length. Not uncommon at Calcutta in the tidal Hooghly.

670. (3.) Therapon theraps.

Therapon theraps, *Cuv. & Val. H. N. Poiss.* iii, p. 129, pl. 53; *Day, Fish. India*, p. 70, pl. xviii, fig. 6 (see synon.).

Kutta keetchan, Tam.; *Nga sabásá*, "Paddy-eating fish," Arracan; *Boorgooni* and *Jeerpye*, Chittagong.

D. 12/10. P. 15. A. 3/8. L. l. 50–55. L. tr. 11/16. Vert. 10/15.

Length of head 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{2}$ in length of head, 1 from end of snout and also apart. Preorbital very finely serrated on its lower edge. Preopercle nearly evenly serrated; sub- and interopercles entire in adults. Lower opercular spine long. *Teeth*—an outer somewhat enlarged row. *Fins*—fourth dorsal spine slightly the longest, second anal spine stronger but rather shorter than the third; caudal emarginate. *Scales*—above the lateral line a little smaller than those below it. *Colour*—silvery, with 4 (sometimes 3) horizontal blackish-brown lines. Dorsal fin with a black blotch between its 3rd and 7th spines, and a dark band along upper portion of rays. A horizontal black band along first half of anal. Caudal with two oblique bands across each lobe, the higher band

on the upper lobe interrupted in adults, the lobe has likewise a black tip. In the *young* the colour is dark with two light bands only half the width of the darker ones. A large black shoulder-spot is sometimes visible. There are teeth on the vomer.

Hab. East coast of Africa, seas of India, the Malay Archipelago and China; attaining at least 10 inches in length.

671. (4.) Therapon quadrilineatus.

Holocentrus quadrilineatus, *Bloch, Ich.* t. 238, fig. 2.
Therapon quadrilineatus, *Day, Fish. India*, p. 70, pl. xviii, fig. 5 (see synon.).

D. 11–12/10. P. 15. A. 3/10. L. l. 70. L. tr. 13/26. Cæc. pyl. 18.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ from end of snout and also apart. Preorbital slightly serrated on its lower border. Preopercle serrated along both margins, most coarsely at its rounded angle. *Teeth*—external row in maxilla enlarged. *Fins*—fifth dorsal spine highest; second anal spine strongest, the third longest; caudal emarginate. *Pyloric appendages*—very short. *Colour*—silvery, with 5 (sometimes 4) horizontal black bands. A large black blotch on the shoulder. Dorsal fin with a black blotch between its third and seventh spines, a black mark along the middle of the soft dorsal, and a black tip. Pectoral, ventral, and anal canary-colour, the last darkest externally, and with a dark basal band; caudal yellowish, with a dark edge, but no bands.

The *young* have six light vertical cross bands from the back to the fourth horizontal band.

Hab. Seas of India to the Malay Archipelago and China; attaining at least 6 inches in length.

672. (5.) Therapon argenteus.

Datnia argentea, *Cuv. & Val. H. N. Poiss.* iii, p. 139, pl. 54; *Day, Fish. India*, p. 71, pl. xviii, fig. 7 (see synon.).

D. 12/10. P. 14. A. 3/8. L. l. 56. L. tr. 30–35. Cæc. pyl. 11.

Length of head 4, height of body 3 to $3\frac{1}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ from end of snout, and $\frac{4}{5}$ apart. Snout pointed. Preorbital serrated along the last half of its lower edge. Preopercle serrated along its vertical margin. *Fins*—4th and 5th dorsal spines the longest; second anal spine very strong, longer than the third, and exceeding the length of the longest in the dorsal fin; caudal notched. *Colour*—silvery, darkest along back; a narrow black outer edge to dorsal fin; a band along middle of anal, which also has a dark margin.

The *young* appear to have longitudinal bands.

This fish has a more elevated body than the typical *Therapons*, the dorsal spines are stronger, and there is a very slight notch between the last two.

Hab. Cape seas, seas of India, the Malay Archipelago, and beyond.

Seventh group. PRISTIPOMATINA.

15. Genus **PRISTIPOMA**, Cuv.

Syn. *Genytremus*, *Genyatremus*, *Anisotremus*, and *Pristocantharus*, Gill; *Hæmulopsis*, Steind.; *Pomadasys*, Bleeker.

Branchiostegals seven; pseudobranchiæ. Body oblong, compressed. Eyes moderate. Cleft of mouth horizontal; gape not very wide; jaws of nearly equal length; a central longitudinal and deep groove below the symphysis of the lower jaw, and two small open pores under the chin; no barbels. Preopercle serrated; opercle with indistinct points. Teeth in the jaws villiform, without canines; palate edentulous. Dorsal with from eleven to fourteen spines; anal with three. Scales ctenoid and of moderate or small size, present on the head, including the preorbital and lower jaw. Air-bladder simple, destitute of any constriction. Pyloric appendages few.

Geographical Distribution. All tropical seas and the Mediterranean. The young of the Indian species are often taken in backwaters.

Uses. Fair as food, but not much esteemed: the air-bladder in some places collected as isinglass.

Synopsis of Indian Species.

A. Second anal spine not longer, or scarcely longer, than 3rd.
- A. 3/9. Longitudinal bands on side ...... 1. *P. stridens*, p. 508.
- A. 3/12. No blotches nor longitudinal bands on side .... 2. *P. olivaceum*, p. 509.
- A. 3/7. Black blotches on side........... 3. *P. maculatum*, p. 510.

B. Second anal spine much longer than 3rd.
- L. tr. 7/18. Six horizontal dark bands on each side .... 4. *P. furcatum*, p. 510.
- L. tr. 7/10. Four or 5 interrupted lines along sides .... 5. *P. hasta*, p. 510.
- L. tr. 5/13. Sinuous lines of black spots on sides .... 6. *P. argenteum*, p. 511.
- L. tr. $6\frac{1}{2}$/15. Two golden lateral bands .... 7. *P. dussumieri*, p. 511.
- L. tr. 6/12. No lateral bands in adult nor spots .... 8. *P. guoraca*, p. 512.
- L. tr. 9/19. Upper half of side with numerous black spots .... 9. *P. operculare*, p. 512.

673. (1.) Pristipoma stridens.

Sciæna stridens, *Forsk. Descr. Anim.* p. 50, no. 58.
Pristipoma stridens, *Day, Fish. India*, p. 72, pl. xviii, fig. 8 (marked *P. nageb*) (see synon.).

D. 12/13–16. A. 3/9. L. r. 95–100/80–85. L. tr. 8–9/18. Cæc. pyl. 5–6.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 to $1\frac{1}{4}$ from end of snout, and 1 apart. Upper profile of head somewhat rounded. Vertical

margin of preopercle serrated in its whole extent, its lowest serrations the strongest; horizontal limb entire, as are also the sub- and interopercles. Shoulder-bone serrated. *Fins*—dorsal spines slender, the fifth highest. Pectoral as long as the head without the snout. Second anal spine stronger than but not quite so long as the third; caudal forked. *Colour*—purplish above, becoming dirty white below, three golden bands on upper part of each side, the lowest from eye to middle of caudal fin; a dark mark on upper third of opercle; dorsal interspinous membrane covered with fine black spots, outer edge and also that of the caudal and anal stained grey; many fine dots over the head and body.

Hab. Red Sea, along the Mekran coast, and very common at Karáchi in Sind; attaining at least 6 inches in length.

674. (2.) **Pristipoma olivaceum.** (Fig. 154.)

Pristipoma olivaceum, *Day, Fish. India*, p. 73, pl. xix, fig. 1.

D. 12/15. P. 17. A. 3/12. C. 17. L. l. 55. L. tr. 9/15. Cæc. pyl. 6.

Length of head $3\frac{3}{4}$ to 4, height of body 3 to $3\frac{1}{3}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, 1 from end of snout, and $1\frac{1}{4}$ apart. *Fins*—fourth dorsal spine the highest. Pectoral

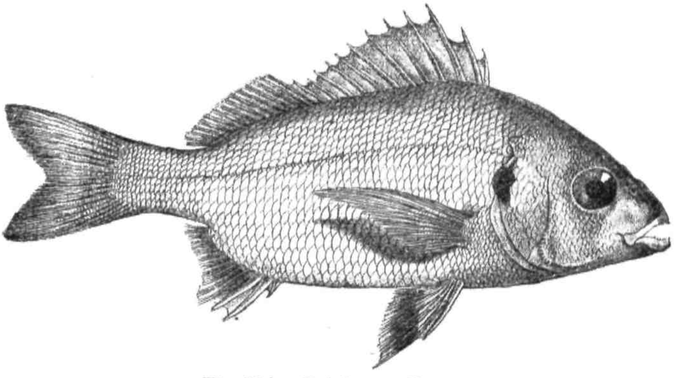

Fig. 154.—*Pristipoma olivaceum.*

pointed and nearly as long as the head; second anal spine strongest, and nearly as long as the third. Caudal emarginate. *Scales*—in oblique rows above and horizontal below the lateral line. *Colour*—olive-grey, the head glossed with purple, a large black blotch bordered in front with yellow at the upper angle of the opercle; pectoral yellow, as is also the basal half of the ventral, the distal half is black with a white edge; the other fins stained with blackish and having fine deep brown dots. Eyes golden.

Hab. Coasts of Baluchistan and Sind; attaining at least a foot in length.

strong, one fourth longer than the third; caudal emarginate, deeply lunate. *Colour*—greyish, becoming white on the abdomen; a brilliant golden band passes from the eye to the base of the caudal fin, a second above it runs along a few rows of scales. Fins silvery, dashed with gold, a dark band along the base of the dorsal and its spinous portion with a black margin; upper portions of soft dorsal and the last half of spinous dorsal dark grey.

Hab. Seas of India; more common on the East than on the West coast, but nowhere numerous.

680. (8.) Pristipoma guoraca.

Pristipoma guoraca, *Cuv. & Val. H. N. Poiss.* v, p. 256; *Day, Fish. India*, p. 75, pl. xx, fig. 1 (see synon.).

D. 12–13/12–14. P. 16. A. 3/7–8. L. l. 45–47. L. tr. 6/12. Cæc. pyl. 5.

Length of head $3\frac{1}{2}$, height of body nearly 3 in the total length. *Eyes*—diameter $3\frac{1}{3}$ to $3\frac{2}{3}$ in length of head, 1 to $1\frac{1}{3}$ from end of snout and also apart. Vertical border of preopercle coarsely serrated, also its produced and rounded angle, where the serrations are wide apart, along the horizontal limb they are much blunter. *Fins*—third and fourth dorsal spines the longest. Pectoral equals the length of the head; second anal spine the longest, and striated in grooves along its front edge; caudal cut square or slightly emarginate. *Colour*—silvery, darkest along the back, and in the young with an indistinct darkish band along the middle of the body; a dark spot, having steel-blue reflexions, on the opercle; snout dark; a dark streak along the dorsal fin, most distinct in the immature.

Hab. Seas of India to the Malay Archipelago, and said to have been captured in fresh water.

681. (9.) Pristipoma operculare.

Pristipoma operculare, *Playfair, Fish. Zanz.* p. 24, pl. 4, fig. 1; *Day, Fish. India*, p. 76, pl. xx, fig. 2.

D. 11/14. P. 19. A. 3/9. C. 17. L. l. 57. L. tr. 9/19. Cæc. pyl. 5.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter 5 to $5\frac{1}{2}$ in length of head, $1\frac{3}{4}$ from end of snout, and $1\frac{1}{3}$ apart. Snout pointed. *Fins*—the fourth dorsal spine the highest. Pectoral as long as the head; the second anal spine the strongest and longest, equal to the third dorsal spine; caudal emarginate. *Cæcal appendages*—very long. *Colour*—silvery, with a black blotch at the upper posterior corner of the opercle; upper half of body with numerous black spots, sometimes forming undulating bands; a black spot at the base of each dorsal spine and ray; dorsal and caudal dark-edged; anal blackish in its front half.

Hab. East coast of Africa to Sind, where it is common; attaining at least 15 inches in length.

16. Genus HAPALOGENYS, Richards.

Syn. *Pogonias*, sp., Temm. & Schleg.

Branchiostegals six or seven; pseudobranchiæ. Body compressed. Cleft of mouth horizontal; the anterior and under surfaces of the lower jaw and the lips covered with fine barbel-like papillæ. Preopercle serrated; opercle with short spines. Villiform teeth in the jaws, vomer, and palatines; an outer row of conical but somewhat obtuse teeth in each jaw, but no canines; tongue smooth. Dorsal fin with eleven spines; anal with three; caudal convex or slightly notched. Scales ctenoid, of moderate or small size, and extended over the fins. Air-bladder simple. Pyloric appendages few.

Geographical Distribution. Seas of Sind to China and Japan.

682. (1.) Hapalogenys petersi. (Fig. 155.)

Hapalogenys petersi, *Day, Fish. India*, p. 77, pl. xx, fig. 3.

D. 11/19. P. 19. A. 3/13. C. 17. L. l. ca. 100.

Length of head $3\frac{1}{2}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, rather above 1 from end of snout, and $\frac{3}{4}$ apart. *Fins*—dorsal spines of moderate strength, very low

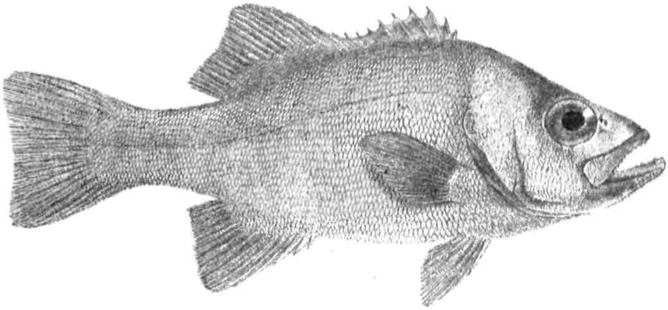

Fig. 155.—*Hapalogenys petersi.*

in proportion to the rays, third highest; soft portion of the fin highest anteriorly; third anal spine much longer and stronger than the second, soft portion of the fin similar to that of the soft dorsal; caudal emarginate. *Colour*—blackish grey, with the fins darker.

Hab. Sind and Mekran coast, being termed *Dah-ri* at Gwádar. The species was not uncommon and the specimens were large, the smallest being 18 inches in length.

17. Genus **DIAGRAMMA**, Cuv.

Syn. *Plectorhynchus*, pt., Lacép.

Branchiostegals six or seven; pseudobranchiæ. Body oblong, compressed, with the upper profile of the head very convex. Eyes moderate. Mouth small, slightly protractile; lips thick and folded back. Preopercle serrated; suborbitals entire. Four or six open pores on the under surface of the lower jaw, but no median groove. Teeth in jaws villiform, without canines; palate edentulous. One dorsal fin more or less receivable into a groove along its base, having from nine to fourteen spines; anal with three. Scales ctenoid, usually small. Air-bladder simple, destitute of any constriction. Pyloric appendages few.

Geographical Distribution. From the Red Sea and east coast of Africa, through the seas of India to the Pacific. These fishes are much more abundant off Sind and Bombay than they are on the Malabar or Coromandel coasts of India.

Uses. Generally not in much esteem as food, but some are good eating.

The species forming this genus are subject to considerable variations in the number of dorsal rays, whilst a spine more or less may exist. The colour, too, varies almost as widely as amongst the *Serrani*. The form of the caudal fin often varies considerably in the same species, and this does not appear to be simply due to age.

Synopsis of Indian Species.

Dorsal with 14 spines	1. *D. crassispinum*, p. 514.
D. 12–13/18–20, L. tr. 13/24. Longitudinally banded	2. *D. lineatum*, p. 515.
D. 12–13/17–19, L. tr. 11/30. Longitudinally banded	3. *D. cuvieri*, p. 516.
D. 13/17–18, L. tr. 13/25. Longitudinal bands, or rows of spots, or upper half dark with large white spots	4. *D. orientale*, p. 516.
D. 12/16–17, L. tr. 14–20. Upper parts and vertical fins spotted	5. *D. cinctum*, p. 517.
D. 11–12/18–21, L. tr. 13/26. Uniform grey, fins blackish	6. *D. griseum*, p. 517.
D. 9–10/22–23. Longitudinally banded, caudal rounded	7. *D. pictum*, p. 518.
D. 9–10/22–25. Yellow spots throughout, caudal emarginate	8. *D. punctatum*, p. 518.
D. 12/19, L. tr. 16–17/31–32. Black above, with 4 large light blotches	9. *D. picoides*, p. 519.

683. (1.) Diagramma crassispinum.

Diagramma crassispinum, *Rüppell, N. W., Fische*, p. 125, t. 30, fig. 4; *Day, Fish. India*, p. 78, pl. xx, fig. 4 (see synon.).

Tawooloo pinnel, Tamil.

B.vii. D.14/15–16. P.17. A.3/7. L.l.50–60. L.tr. 10/17. Cæc.pyl.6.

Length of head $3\frac{1}{2}$, height of body in adult 3 in the total length. *Eyes*—diameter in the adult $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ from end of snout, and more than 1 apart. Ventral margin of preopercle finely serrated in adult, more coarsely in young, angle rounded, posterior half of horizontal margin serrated. *Fins*—dorsal spines strong, alternately thicker on each side, the fourth the highest. Second anal spine much stronger than the third, and equal to the highest of the dorsal fin. *Colour*—greyish, or slaty grey, with a violet tinge on the head and a brassy one on the body; fins nearly black. A few irregular coppery spots on the body; fins, except the spinous dorsal, of a violet slate-colour, lightest along their centres. In the *young* the caudal is yellowish white.

This fish appears to alter considerably with age. The height of the body is at first equal to nearly half of the total length.

Hab. Red Sea, seas of India, the Malay Archipelago and beyond. This fish attains two feet or more in length and is good eating.

684. (2.) Diagramma lineatum.

Perca lineata, *Gmel. Syst. Nat.* p. 1319.
Diagramma lineatum, *Day, Fish. India*, p. 78, pl. xx, fig. 5 (see synon.).

B.vi. D.12-13/18-20. P.19. A.3/7. L.l.59. L.r.86/66. L.tr.13/24.

Length of head about 4, height of body from $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 to $3\frac{1}{2}$ in length of head, 1 from end of snout, and nearly 1 apart. Vertical limb of preopercle very slightly emarginate, its angle rounded, and the whole finely and evenly serrated. *Fins*—dorsal spines strong, every alternate one broadest on one side, they increase in height to the fourth, the last about one fifth shorter; soft portion of the fin gradually increasing in height, its middle third higher than the spinous; second anal spine stronger and slightly longer than the third; caudal rounded or cut rather square. *Colour*—yellowish white above, becoming white on the sides and abdomen; about six horizontal chestnut-coloured bands, the upper wider than the ground-colour, extend from the head along the body; fins yellow, with sometimes one or more dark blotches; dorsal with a dark edge; three oblique bands occasionally broken up into blotches across either caudal lobe; a band along the middle of the anal fin.

Variety (*D. albovittatum*). Silvery white above, yellowish white below; a dark chestnut median band from the occiput to the dorsal fin, continued along base of spines until it joins the second band, which passes above the eye, and gradually increasing in width, arrives at the soft dorsal, and terminates on the fin in a wedge-shaped form; the third band extends from the snout through the eye, becomes the widest, and arriving at the centre of the base of the tail is continued in a wedge-shape to the termination of the fin.

In some specimens a wide chestnut band covers the abdomen, eaving only a very narrow whitish interspace between it and the

band above; in such specimens the colour of the body is chestnut, with three narrow white or light longitudinal bands.

Hab. Red Sea, seas of India, the Malay Archipelago, and beyond.

685. (3.) **Diagramma cuvieri.**

Bodian cuvieri, *Bennett, Fish. Ceylon*, p. 13, pl. xiii.
Diagramma cuvieri, *Day, Fish. India, Suppl.* 1888, p. 785 (see synon.).

B. vii. D. 12–13/17–19. P. 18. A. 3/7. C. 15. L. l. 70. L. tr. 11/30.

Length of head $3\frac{1}{2}$ to 4, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $3\frac{1}{4}$ in length of head, $1\frac{1}{3}$ from end of snout, and 1 apart. Vertical limb of preopercle serrated. *Fins*—dorsal spines slightly higher than the rays, the second to the fourth being about equal and longest; second anal spine the longest and strongest. *Colour*—silvery, with horizontal greyish or brownish bands, the upper of which are wider than the ground-colour; the bands unite anteriorly over the nape and snout, and the upper terminate behind on the base of the dorsal fin. Fins yellowish; caudal and anal with some dark spots and dark outer edges.

Hab. From the east coast of Africa to Ceylon and the Malay Archipelago.

686. (4.) **Diagramma orientale.**

Anthias orientalis, *Bloch, Ich.* t. 326, fig. 3.
Diagramma orientale, *Day, Fish. India*, p. 80, pl. xx, fig. 6 (see synon.).

B. vi. D. 13/17–18. P. 17. A. 3/7. L. r. 100/85. L. tr. 13/25.

Length of head from $4\frac{1}{3}$ to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter from 3 to $3\frac{1}{2}$ in length of head, 1 from end of snout. Vertical border of preopercle serrated. *Fins*—dorsal spines moderate, every alternate one broader on one side, 2nd nearly as high as 3rd, which is the longest, the last one third to one half shorter; soft portion of fin gradually increasing in height, its middle third being higher than the spinous; second anal stronger and longer than third; caudal rounded or cut rather square. *Colour*—yellowish above, white on the sides and beneath, the body with several chestnut bands nearly or quite as wide as the ground-colour; sometimes upper half of fish dark with large whitish spots, but more often there are 4 or 5 complete or interrupted horizontal bands along the snout and head, which form 3 or 4 on the body. Spinous dorsal with a narrow dark upper edge; a dark angular band along the base; a similar wedge-shaped band on the soft dorsal. Pectoral yellowish, a dark blotch covering all but the margin; a black band along the middle of the anal and an oblique one across each lobe of the caudal, the lower sometimes divided into two, or having a light spot in its centre.

Hab. Red Sea, seas of India, the Malay Archipelago, and beyond.

687. (5.) Diagramma cinctum.

Diagramma cinctum, *Temm. & Schleg. Faun. Japon., Poiss.* p. 61, pl. xxvi, fig. 1; *Day, Fish. India,* p. 81, pl. xxi, fig. 1 (see synon.).

B. vii. D. 12/16–17. P. 17. A. 3/7. L. l. 56. L. tr. 14/20.

Length of head $3\frac{2}{3}$, height of body 3 in the total length. *Eyes*—diameter $4\frac{1}{4}$ in length of head, $1\frac{1}{4}$ from end of snout, and 1 apart. Vertical margin of preopercle and shoulder-bone serrated. *Fins*—dorsal spines strong, increasing in length to the fourth and fifth, then decreasing; soft portions of dorsal and anal rounded. Pectoral does not reach so far as the ventral; second anal spine much stronger and longer than the third; caudal cut square. *Colour*—slaty grey, upper half of anterior and whole posterior portion of body, with the vertical fins, covered with large black blotches. Dorsal, caudal, and anal with black margins; ventral nearly black; pectoral yellow.

Hab. Sind, where it is not uncommon, attaining to two feet in length; also China and Japan.

688. (6.) Diagramma griseum. (Fig. 156.)

Diagramma griseum, *Cuv. & Val. H. N. Poiss.* v, p. 306; *Day, Fish. India,* p. 81, pl. xxi, fig. 2, *Suppl.* p. 785 (see synon.).

B. vii. D. 11–12/18–21. P. 17. A. 3/7–9. L.l. 63. L.tr. 13/26. C.pyl. 9.

Length of head $3\frac{2}{3}$ to 4, height of body 3 in the total length. *Eyes*—diameter from $3\frac{1}{3}$ in the young to 4 in length of head, $1\frac{1}{2}$ from end of snout, and 1 apart. Vertical border of preopercle rather strongly and evenly serrated, angle rounded and also serrated.

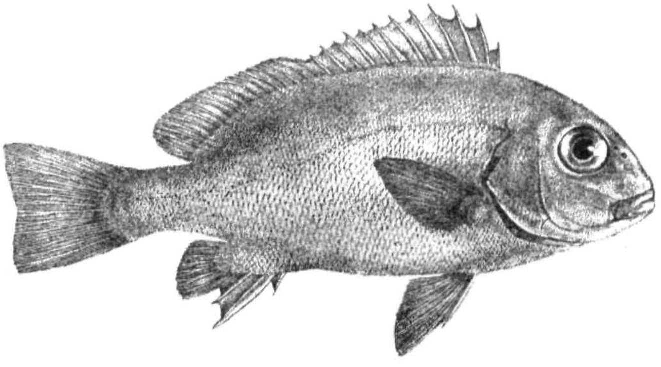

Fig. 156.—*Diagramma griseum.*

Shoulder-bone serrated. *Fins*—dorsal spines moderate, the third or fourth highest. Pectoral about equal to ventral; second anal spine strongest and longest; caudal slightly emarginate. *Colour*—uniform grey or olive-grey, with the fins nearly or quite black. In

the *young* the general colour is olive, with some sinuous and narrow light blue lines, which usually fade shortly after death.

Hab. East coast of Africa, Baluchistan coast, and seas of India, attaining at least 18 inches in length; very common in Sind and Bombay.

689. (7.) **Diagramma pictum.**

Perca picta, *Thunb. K. Vet.-Akad. Nya Handl. Stockholm*, xiii, 1792, p. 142, pl. v, fig. 1.

Diagramma pictum, *Day, Fish. India*, p. 81, pl. xxi, fig. 3 (see synon.).

B. vi. D. 9–10/22–23. P. 17. A. 3/7. L. r. 120/100. L. tr. 15/26.

Length of head $4\frac{1}{2}$, height of body $3\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ (in the young) to $4\frac{1}{2}$ in length of head, $1\frac{1}{4}$ to 2 from end of snout, and nearly 1 apart. *Fins*—dorsal spines moderate, 3rd usually highest, 2nd and 4th spines are nearly the same; last spine less than one half length of third, the rays are a little higher than the spine; second and third anal spines about the same length; caudal cut nearly square, or with rounded angles. *Colour*—this species has been divided into several on account of variations in colour. Ground-colour orange-yellow or white, with chestnut-brown or black straight longitudinal bands, varying in number and breadth, sometimes bifurcating. The bands usually are from 4 to 7 in number and are occasionally broken up into spots. Dorsal fin with a narrow black margin, and a broad dark band from the upper two thirds of the second spine backwards and downwards to the base of the fin; this band is sometimes interrupted, if continuous it coalesces with the upper body-band, and is continued in a wedge-shaped form to the extremity of the soft dorsal fin. Caudal with a central wedge-shaped dark band, and cross bands over its upper and lower angles; lower half of anal and end of ventral black.

Hab. Red Sea, east coast of Africa, seas of India, the Malay Archipelago, and beyond.

690. (8.) **Diagramma punctatum.**

Diagramma punctatum (*Ehrenberg*), *Cuv. & Val. H. N. Poiss.* v, p. 302; *Day, Fish. India*, p. 83, pl. xxi, fig. 2 (see synon.).

Hotya, Maráthi.

B. vii. D. 9–10/22–25. P. 17. A. 3/7. L. r. 105–109/90–95. L. tr. 15/20.

Length of head from $4\frac{1}{4}$ to $4\frac{1}{2}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter from 4 to $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ to 2 from end of snout, and about 1 apart. Vertical border and rounded angle of preopercle serrated. *Fins*—dorsal spines moderate, the second and third the longest; second anal spine slightly the strongest, but the third a little the longest; caudal lunate. *Colour*—greyish, several rows of large brilliant golden spots along the upper half of the body; bluish bands on sides of head continued

on to the body between the rows of spots; dorsal, caudal, anal, and ventral spotted, the latter greyish externally; pectoral golden.

Hab. Red Sea, seas of India to the Malay Archipelago.

691. (9.) **Diagramma picoides.**

Diagramma picoides, *Peters, Monatsb. Akad. Wiss. Berl.* 1866, p. 94; *Day, Fish. India,* p. 83.

B. vii. D. 12/19. P. 17. A. 3/7. L. l. 100. L. tr. 16–17/31–32.

Length of head $4\frac{1}{2}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{2}{3}$ from end of snout, and $1\frac{1}{3}$ apart. *Fins*—dorsal spines moderate, 3rd a little more than one third height of body; second anal spine slightly longer and much stronger than the third, and one third longer than the highest in the dorsal fin. *Colour*—upper half of body black, with four large light blotches, one over the snout, a second across the nape, a third under the commencement of the dorsal rays, and the last over the free portion of the tail. Line of division between white abdomen and black of back zigzag or wavy. Tail with a row of black spots. Dorsal fin with a black base and upper edge, and a white median longitudinal band. Anal and caudal with irregular black spots.

Hab. Most probably the East Indies, but possibly the Mauritius, or the Cape of Good Hope.

18. Genus **LOBOTES**, Cuv.

Branchiostegals six; pseudobranchiæ. Body and fins somewhat elevated. Eyes rather small. Mouth moderately protractile, its cleft oblique, lower jaw the longer. Opercle with obtuse points; preopercle serrated. Villiform teeth in the jaws with an external enlarged row; no canines; palate edentulous. One dorsal fin with twelve stout spines; anal with three; caudal rounded. Scales ctenoid, of moderate size, extended over the head. Air-bladder simple, without constriction.

Geographical Distribution. Seas of India, China, and Atlantic coasts of America.

692. (1.) **Lobotes surinamensis.** (Fig. 157.)

Holocentrus surinamensis, *Bloch, Ich.* t. 243.
Lobotes surinamensis, *Day, Fish. India,* p. 84, pl. xxi, fig. 5 (see synon.).

Parrandee, Mal.; *Musalli,* Tam.; *Chota bekkut,* Ooriah.

D. 12/15–16. A. 3/11–13. L. tr. 9–11/22. Cæc. pyl. 4. Vert. 13/11.

Length of head from $3\frac{1}{2}$ to $3\frac{2}{3}$, height of body $2\frac{1}{2}$ to 3 in the total length. *Eyes*—diameter 6 to 7 in the length of head, 1 from end of snout, and $1\frac{1}{2}$ to 2 apart. *Fins*—dorsal spines strong, 4th to 7th subequal and longest; soft portion of fin higher than spinous; third anal spine longer than second; caudal rounded.

Colour—brassy brown blotched darker, the extremity of caudal and pectoral dirty yellowish white; the other fins slate-coloured.

This fish varies considerably with age.

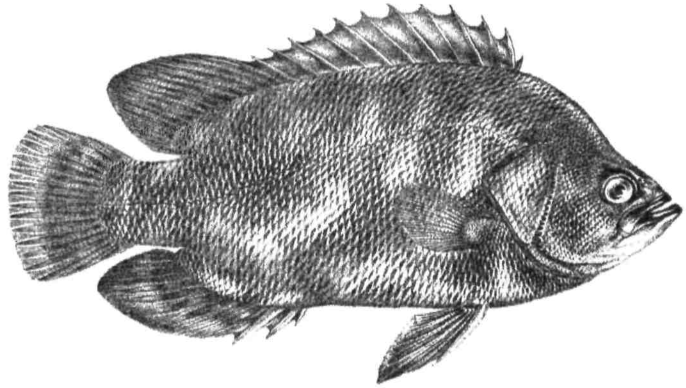

Fig. 157.—*Lobotes surinamensis.*

Hab. East coast of Africa, seas of India, the Malay Archipelago, and beyond; likewise in the Mediterranean; attaining at least $2\frac{1}{2}$ feet in length. Excellent as food.

19. Genus SCOLOPSIS, Cuv. & Val.

Syn. *Scolopsides*, Cuv.

Branchiostegals five; pseudobranchiæ. Body oblong. Eyes moderate or large. Mouth moderately protractile; jaws of nearly equal length; cleft of mouth horizontal. Infraorbital arch with a spine directed backwards; preopercle as a rule serrated, and often the suborbital ring; opercle with a weak spine. A single dorsal fin with ten spines; anal with three; caudal emarginate or forked. Scales ctenoid. Air-bladder without any constriction, simple. Pyloric appendages few.

Geographical Distribution. Indo-Pacific Ocean. On the coasts of Sind and Bombay, the Andamans and Nicobars several species occur abundantly.

Synopsis of Indian Species.

One or two black blotches on the lateral line.	1. *S. bimaculatus*, p. 521.
A bent blue band from the upper jaw through the eye to the axilla	2. *S. phæops*, p. 521.
A curving wide yellow, black-edged band from the mouth to the soft dorsal	3. *S. bilineatus*, p. 522.
Four light bands on head and side; a black spot in the axilla; scales below lateral line with black spots................	4. *S. ghanam*, p. 522.

A deep black band from the eye to above the base of the caudal fin .... 5. *S. monogramma*, p. 522.
Longitudinal white streaks on sides. Several irregular and wide dark vertical body-bands .... 6. *S. cancellatus*, p. 523.
A light band over the opercles, and a longitudinal light line along the body ...... 7. *S. vosmeri*, p. 524.
A dark-edged light band from eye to tail .. 8. *S. leucotænia*, p. 524.
A silvery line between lateral line and dorsal, no other light bands .... 9. *S. ciliatus*, p. 525.

693. (1.) Scolopsis bimaculatus.

Scolopsis bimaculatus, *Rüppell, Atl. Fische*, p. 8, t. ii, fig. 2; *Day, Fish. India*, p. 85, pl. xxi, fig. 1 (see synon.).

D. 10/9. P. 18. A. 3/7. C. 17. L. l. 48. L. tr. $4\frac{1}{2}$/14.

Length of head about 4, height of body $3\frac{1}{4}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter 3 in length of head, 1 from end of snout, and $\frac{3}{4}$ apart. *Fins*—dorsal spines strong, the fourth the highest; second anal spine stronger but shorter than the third; caudal lunate. *Colours*—greyish, becoming dull white on the abdomen; a broad light opercular band. Branchiostegal membranes blood-red. A brownish band over the snout, and one or two blotches on the lateral line, the first large, or the two may be joined. Fins orange, becoming reddish externally. Eyes silvery.

Hab. Red Sea, seas of India and China.

694. (2.) Scolopsis phæops.

Scolopsides phæops, *Bennett, P. Z. S.* 1831, i, p. 165.
Scolopsis phæops, *Day, Fish. India*, p. 85, pl. xxii, fig. 2 (see synon.).

D. 10/9. P. 16. V. 1/5. A. 3/7. C. 17. L. l. 46–48. L. tr. 5/16.

Length of head 4 to $4\frac{1}{3}$, height of body $3\frac{2}{3}$ to $3\frac{1}{4}$ in the total length. *Eyes*—diameter $4\frac{1}{2}$ in length of head, $1\frac{1}{2}$ from end of snout, and $1\frac{1}{3}$ apart. *Fins*—dorsal spines moderate, increasing in length to the fourth, which equals one third of the height of the body; third anal spine longer than the second but not quite so strong, and equalling two sevenths of the height of the body; caudal forked, upper lobe somewhat the longer. *Colour*—greenish olive above the lateral line, becoming yellowish white below; a narrow light band along the back close to the base of the dorsal fin. A wide bright blue band from the eye to the upper jaw, and from the posterior edge of the eye to the axilla, where it ends in a blue spot. Fins reddish.

Hab. East coast of Africa, seas of India; not uncommon off Sind. Specimens were taken $9\frac{1}{2}$ inches in length.

695. (3.) Scolopsis bilineatus.

Anthias bilineatus, *Bloch, Ich.* t. 325, fig. 1.
Scolopsis bilineatus, *Day, Fish. India,* p. 85, pl. xxii, fig. 3 (see synon.).

D. 10/9. P. 16. A. 3/7. C. 17. L. l. 46. L. tr. 4/14. Cæc. pyl. 5.

Length of head 4 or a little less, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{3}{4}$ in length of head, $\frac{2}{3}$ from end of snout, and 1 apart. *Fins*—dorsal spines not strong, increasing in height to the fourth, which equals three sevenths of the height of the body. Pectoral extends nearly to above anal spines, the second of which is very strong, longer than the third, and equal to rather more than half of the height of the body; soft dorsal and anal angularly rounded; caudal forked. *Colour*—a white band from snout to origin of dorsal; a second, parallel, from above orbit to below last dorsal spine; a third from upper edge of eye to lateral line. A wide, yellow, black-margined band curves upwards from the mouth to the commencement of the soft dorsal. A large yellow blotch below last half of soft dorsal, which fin is edged with black; anal black in its front half and white behind.

Hab. Andamans and Malay Archipelago.

696. (4.) Scolopsis ghanam.

Sciæna ghanam, *Forsk. Descr. Anim.* p. 50, no. 56.
Scolopsis ghanam, *Day, Fish. India,* p. 86, pl. xxii, fig. 4 (see synon.).

D. 10/9. P. 17. A. 3/7. L. l. 46. L. tr. 4/14. Cæc. pyl. 6 (4).

Length of head 4 to $4\frac{1}{3}$, height of body $3\frac{1}{3}$ to $3\frac{2}{3}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ from end of snout, and 1 apart. Scaleless portion of the head covered with numerous small pores. *Fins*—the dorsal spines, which are rather weak, increase in length to the fifth; second and third anal spines equal; caudal deeply forked. *Colour*—back olive; three yellowish-white bands, parallel with the lateral line, on the upper part of each side, a fourth shorter band from below the eye to the base of the pectoral fin, which has a black spot in its axil. Most of the scales below the lateral line in the anterior two thirds of the body have each a black spot at its base. A violet mark is present at the base of either lobe of the caudal fin.

Hab. Red Sea and Andaman Islands, where it is very common.

697. (5.) Scolopsis monogramma.

Scolopsides monogramma (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* v, p. 338.
Scolopsis monogramma, *Day, Fish. India,* p. 86, pl. xxii, fig. 5 (see synon.).

D. 10/9. P. 17. A. 3/7. C. 17. L. l. 44. L. tr. 5/14.

Length of head 4, height of body $3\frac{3}{4}$ in the total length. *Eyes*—

diameter 3 in length of head, nearly 1 from end of snout and also apart. *Fins*—dorsal spines slender, increasing in length to the fourth, which equals three sevenths of the height of the body. Second anal spine stronger but shorter than the third, which equals three tenths of the height of the body; caudal forked. *Colour*—olive, with a deep black band, one scale wide, from the snout through the eye to above the base of the caudal fin. Fins immaculate.

Hab. Andamans to the Malay Archipelago. At least 5 inches long.

698. (6.) **Scolopsis cancellatus.** (Fig. 158.)

Scolopsides cancellatus, *Cuv. & Val. H. N. Poiss.* v, p. 351.
Scolopsis cancellatus, *Day, Fish. India*, p. 86, pl. xxii, fig. 6 (see synon.).

D. 10/9. P. 15. A. 3/7. C. 17. L. l. 44. L. tr. $3\frac{1}{2}$/14.

Length of head 4, height of body 4 in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and $\frac{3}{4}$ apart. Scaleless portion of the head studded with fine open pores. Preorbital spine moderate, fluted. *Fins*—dorsal spines weak, increasing in length to the fifth; second anal spine stronger but a little shorter than the third. *Colour*—greyish above and whitish below the lateral line; a white streak from snout to base of first dorsal

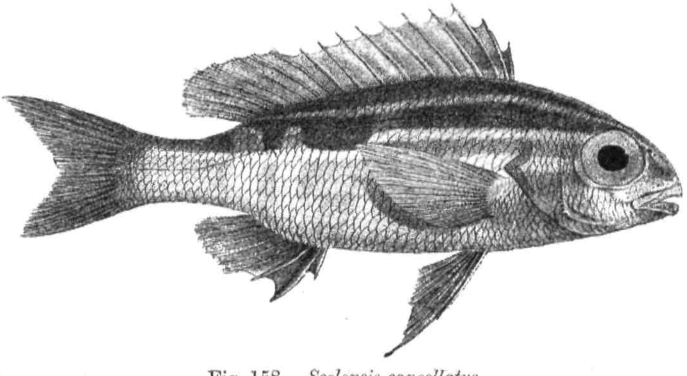

Fig. 158.—*Scolopsis cancellatus.*

spine; a second from over orbit to posterior end of dorsal; a third from the eye to opposite the end of pectoral; a fourth from middle of eye to upper third of caudal. Several wide but irregular dark vertical bands from the back to the middle of the body. A black spot between the first and third dorsal spines in their lower half. The longitudinal bands are more distinct and regular in the young than in the adult, and the black spot on the spinous dorsal usually disappears with age.

Hab. Andamans, the Malay Archipelago, and beyond.

699. (7.) Scolopsis vosmeri.

Anthias vosmeri, *Bloch, Ich.* t. 321; *Bl. Schn. Syst. Ich.* p. 304.
Scolopsis vosmeri, *Day, Fish. India,* p. 87, pl. xxiii, fig. 1 (young), fig. 2 (semi-adult), fig. 3 (adult) (see synon.).

Kundul, Tam.

D. 10/9. A. 3/7. L. l. 42–44. L. tr. $3\frac{1}{2}$–4/13–14. (Cæc. pyl. 3, Kner.)

Length of head 4 to $4\frac{1}{2}$, height of body $2\frac{1}{2}$ to 3 in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 (in the adult) in length of head, $\frac{2}{3}$ from end of snout, and $\frac{3}{4}$ to 1 apart. Preorbital armed superiorly with one strong fluted spine projecting backwards; above this spine is another directed both forwards and backwards: in some specimens these are very small, especially the anterior one. *Fins*—dorsal spines strong, each alternate one broader; they increase in length to the fourth or fifth, from these they continue about equal; the rays are of about the same height. Anal spines strong, the third nearly equal to the highest in the dorsal fin, but shorter than the second; caudal forked. *Colour*—adult a pale dull red, usually with a whitish band round the opercles, from the upper edge of which a longitudinal wide white line passes backwards below the lateral line, being lost beneath the end of the base of the dorsal fin. Every scale on the body has generally a dark basal mark. In the medium-sized fish (*S. japonicus*) the ground-colour is often the same as in the adult, but in others it is an ashy grey; the opercular band is generally distinct and of a cream-yellow colour. There is a deep arterial blood-red spot behind the opercular spine, and the fins are pale yellow. In the young (*S. torquatus*) the band on the opercles is very distinct and of a light lemon-yellow colour, whilst the blood-red spot behind the opercular spine is very well marked; the inside of the mouth is likewise red.

Hab. Red Sea, east coast of Africa, seas of India, the Malay Archipelago, and beyond; attaining at least 12 inches in length.

700. (8.) Scolopsis leucotænia.

Scolopsides leucotænia, *Bleeker, Batavia Nat. Tijdsch.* iii, p. 451.
Scolopsis leucotænia, *Day, Fish. India,* p. 88, pl. xxiii, fig. 4 (see synon.).

D. 10/9. P. 17. A. 3/7. L. l. 39. L. tr. $3\frac{1}{2}$/13.

Length of head equals one fourth less than height of body. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{2}$ from end of snout, and 1 apart. *Fins*—dorsal spines strong, increasing in length to the fourth; second anal spine much the strongest and considerably the longest. *Colour*—a broad yellowish-white streak from eye to tail, margined above and below with a dark purple stripe; above it the body is reddish brown, below yellowish; a dark purplish vertical band extends down the opercle. Fins reddish, the dorsal with a fine black upper edge and a dark band along the centre of its spinous portion.

Hab. Bombay to the Malay Archipelago.

701. (9.) Scolopsis ciliatus.

Holocentrus ciliatus, *Lacép. H. N. Poiss.* iv. pp. 333, 371.
Scolopsis ciliatus, *Day, Fish. India,* p. 89, pl. xxiii, fig. 5 (see synon.).

D. 10/9. A. 3/7. L. l. 44. L. tr. $3\frac{1}{2}$–4/15. Cæc. pyl. 5. Vert. 10/14.

Length of head 4 to $4\frac{1}{2}$, height of body $3\frac{1}{3}$ to $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to $2\frac{2}{3}$ in length of head, $\frac{3}{4}$ from end of snout, and 1 apart. A prominent ridge having a serrated edge on the maxilla. *Fins*—dorsal spines slender, increasing in length to the fifth; anal spines not strong, the third weaker but longer than the second, and nearly equalling the longest in the dorsal fin; caudal forked. *Colour*—greenish olive above, becoming lighter on abdomen; a longitudinal silvery-white band between the lateral line and back, from near head to opposite commencement of soft dorsal; the position of this white line, Bleeker observes, is liable to change with age. The scales below the lateral line have a golden spot. Fins reddish.

Hab. Andamans, Malay Archipelago, &c.

20. Genus DENTEX, Cuv.

Syn. *Gymnocranius*, pt., Klunz; *Paradentex*, pt., Blkr.; *Synagris*, (Klein), Bleeker.

Branchiostegals six or seven; pseudobranchiæ. Body oblong, rather elongate, and a little elevated. Mouth moderately protractile, its cleft more or less horizontal; jaws of about equal length. The distance between the eye and the angle of the mouth considerable. Generally strong canines in both jaws; a conical outer lateral row in either jaw; vomer, palate, and tongue edentulous. One scaleless dorsal fin having from ten to thirteen spines, anal with three; the spines generally weak, and more or less provided with a scaly groove. Caudal forked. Scales ctenoid, of moderate size, more than three rows between the eye and the angle of the preopercle, none on the front of the snout, jaws, or preorbital. Air-bladder not constricted, but notched posteriorly. Pyloric appendages few.

This genus has been subdivided from *Synagris*, mostly because of the existence of more than three rows of scales across the preopercle.

Geographical Distribution. The fishes of this genus are found in the Mediterranean, Atlantic, Red Sea, Indian and Pacific Oceans.

702. (1.) Dentex rivulatus.

Dentex rivulatus, *Rüpp. N. W., Fische,* p. 116, pl. xxix, fig. 2; *Day, Fish. India,* p. 90 (see synon.).

D. 10/10. P. 15. A. 3/10. C. 17. L. l. 48. L. tr. 7/20.

Length of head $4\frac{1}{4}$, height of body $3\frac{1}{3}$ in the total length.

Eyes—diameter $3\frac{2}{3}$ in the length of the head, $1\frac{2}{3}$ from end of snout, and $1\frac{1}{4}$ apart. Hind limb of preopercle almost vertical and entire; a few serrations along its rounded angle. *Teeth*—an outer row of strong canines in the upper jaw; lower jaw with six canines. *Fins*—dorsal spines rather strong, increasing in length to the fourth, from which they decrease to the last; height of the fourth equals distance from eye to end of preorbital bone; the last dorsal spine is slightly longer than the ninth; second anal spine two thirds as long as the third; caudal deeply forked. *Scales*—five rows on the cheeks. *Colour*—greenish, glossed with golden on the sides; wavy blue lines along the snout and over the preorbital.

Hab. Red Sea and Ceylon.

21. Genus **SYNAGRIS** (Klein), Günther.

Syn. *Dentex*, pt., Cuv. & Val.; *Nemipterus*, Swains.; *Spondyliosoma*, sp., Cantor; *Heterognathon*, pt., Steind.; *Dentex* (Cuv. & Val.), Bleeker.

Koondul, Tamil.

Branchiostegals five or six; pseudobranchiæ. Body oblong. Mouth moderately protractile; jaws of about equal length. Preopercle entire or feebly serrated; opercle without any or with a not very prominent spine; the distance between the eye and the angle of the mouth considerable. Moderately-sized curved canines in the upper and generally feeble ones in front of the lower jaw; an inner villiform band in either jaw and usually an outer conical row; vomer, palate, and tongue edentulous. Dorsal 10/9; anal 3/7, both scaleless; all the spines weak; caudal forked. Scales ctenoid, three rows on the preopercle, none along its outer border, on the snout, preorbital, or jaws. Air-bladder not constricted, but notched posteriorly. Pyloric appendages few.

Geographical Distribution. Red Sea, east coast of Africa, seas of India to the Malay Archipelago, and beyond.

Synopsis of Indian Species.

Upper caudal ray with filamentous prolongation.
- First two dorsal spines with soft prolongation. 1. *S. striatus*, p. 526.
- Dorsal spines not prolonged .... 2. *S. japonicus*, p. 527.

No prolongation to caudal.
- Dorsal spines longer than rays .... 3. *S. tolu*, p. 528.
- Dorsal spines shorter than rays.
  - A blue spot on opercle .... 4. *S. bleekeri*, p. 528.
  - No spot on opercle .... 5. *S. tæniopterus*, p. 529.

703. (1.) **Synagris striatus.**

Dentex striatus (? *Cuv. & Val. H. N. Poiss.* vi, p. 252); *Jerdon, Mad. Jour. L. & Sc.* xvii, 1851, p. 134.

Synagris striatus, *Day, Fish. India*, p. 90, pl. viii, fig. 5 (marked *Synagris luteus*) (see synon.).

Kandal min, Tam.

B. vi. P. 17. V. 1/5. C. 17. L. l. 48. L. tr. $3\frac{1}{2}$/10.

Length of head $4\frac{1}{3}$, height of body 4 in the total length (excluding the prolonged caudal ray). *Eyes*—diameter $3\frac{1}{4}$ in length of head, 1 from end of snout, and $\frac{2}{3}$ apart. Vertical margin of preopercle finely and evenly serrated in its middle third, the angle rounded and entire. Opercle without any distinct spine. *Teeth*—4 canine-like in front of each premaxillary, the inner in the mandible villiform above the symphysis, laterally in two rows, of which the inner is slightly the larger. *Fins*—first two dorsal spines elongate, the second reaching to the base of the caudal fin; interspinous membrane very slightly notched, the height of the last eight spines gradually increasing; the last not so high as the rays. Ventral reaches anal. Caudal forked, upper lobe with a filamentous prolongation. *Scales*—extend forwards to between the eyes. *Colour*—silvery, with pinkish longitudinal bands. Fins pinkish stained with yellow.

Hab. Coromandel coast of India.

704. (2.) Synagris japonicus.

Sparus japonicus, *Bloch, Ich.* t. 277, fig. 1.

Synagris japonicus, *Day, Fish. India*, p. 92, pl. xxiv, fig. 2, *Suppl.* p. 786 (see synon.).

B. vi. L. l. 48. L. tr. $3\frac{1}{2}$/10.

Length of head 4, height of body 4 in the total length excluding the filamentous prolongation of the upper caudal lobe. *Eyes*—diameter $3\frac{1}{4}$ to $3\frac{1}{3}$ in length of head, $1\frac{1}{4}$ to $1\frac{1}{2}$ from end of snout, and nearly 1 apart. Vertical limb of preopercle finely and evenly serrated in lower half; angle rounded and entire. Opercle without distinct spine. *Teeth*—four to six small curved canines in front of either premaxillary; in the mandible the last six or eight teeth only are conical. *Fins*—dorsal interspinous membrane scarcely notched; height of spines increases to the last; rays rather longer. Pectoral reaches to above anal spines. Ventral with first ray prolonged, reaches anal. Third anal spine slightly weaker than second, but longer. Caudal deeply forked, having a filamentous prolongation to the upper ray. (This may be peculiar to males, but I have reason to believe it is present in the females.) *Colour*—yellowish red; longitudinal reddish lines along each row of scales. Dorsal and anal fins with a yellow streak along their centres, a grey base, and pinkish edge.

Hab. Red Sea, east coast of Africa, seas of India, and the Malay Archipelago.

705. (3.) Synagris tolu. (Fig. 159.)

Dentex tolu, *Cuv. & Val. H. N. Poiss.* vi, p. 248.
Synagris tolu, *Day, Fish. India*, p. 91, pl. xxiii, fig. 6 (see synon.).
Kadakela, Maráthi; *Cundil*, Tam.

B. vi. L. l. 48. L. tr. 3/10. Cæc. pyl. 10–11.

Length of head $4\frac{1}{2}$, height of body 4 to $4\frac{1}{2}$ in the total length. *Eyes*—transversely oval, diameter 3 in length of head, 1 from end of snout, and $\frac{2}{3}$ apart. Preopercle entire. *Teeth*—4 to 6 canine-like anteriorly in either premaxillary, outer lateral row composed of about 16 closely-set and pointed: several rows opposite the mandibular symphysis, the outer rather larger than the others, but not so large as the single lateral row, the teeth in which equal those in upper jaw. *Fins*—dorsal interspinous membrane deeply notched; sixth, seventh, and eighth spines longest, last spine of same length as last ray; ventral with its outer ray elongate, scarcely reaching to

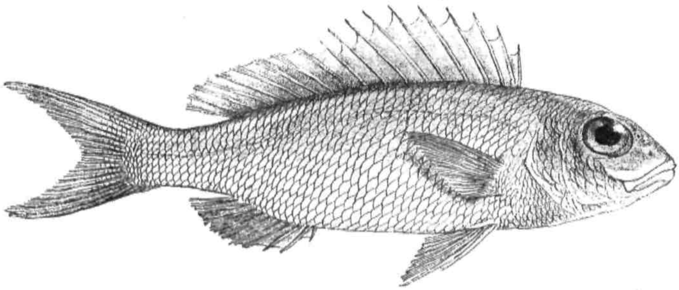

Fig. 159.—*Synagris tolu.*

anus; second anal spine as strong but not so long as third, which equals one third height of body; caudal deeply forked, the upper lobe the longer. Pectoral a little longer in males, extending to the anus. *Colour*—rosy, with four or five yellowish longitudinal bands between the rows of scales from immediately above the base of the pectoral fin. Fins pinkish; tips of dorsal spines orange.

Hab. Seas of India to the Malay Archipelago.

706. (4.) Synagris bleekeri.

Synagris bleekeri, *Day, Fish. India*, p. 92, pl. xxiv, fig. 1.

B. vi. L. l. 48. L. tr. $3\frac{1}{2}$/11.

Length of head 4 to $4\frac{1}{2}$, height of body $4\frac{1}{3}$ in the total length. *Eyes*—transversely oval, diameter $3\frac{3}{4}$ in length of head, $1\frac{1}{4}$ from end of snout, and 1 apart. Preopercle entire or finely serrated. A small flat spine on the opercle. *Teeth*—four small canines in front of each premaxillary, no enlarged lateral row; canine-like teeth in

front of the lower jaw, and a single conical row in last two thirds of mandible. *Fins*—dorsal interspinous membrane scarcely notched, spines increase in length to last, which equals two fifths of height of body, the rays slightly longer; outer ventral ray elongated, nearly reaching anal; anal spines of equal strength, the second not so long as the third; caudal deeply forked, the upper lobe the longer, but no filamentous prolongation was observed in Madras specimens. *Colour*—reddish above, becoming silvery with yellow bands along the sides and beneath; a bluish spot on the opercle; fins reddish, dorsal edged with orange and having a golden band along its base.

Hab. Seas of India; growing to at least 8 inches in length.

707. (5.) Synagris tæniopterus.

Dentex tæniopterus, *Cuv. & Val. H. N. Poiss.* vi, p. 246.
Dentex (Synagris) notatus, *Day, P. Z. S.* 1870, p. 684.
Synagris notatus, *Day, Fish. India*, p. 93, pl. xxiv, fig. 3, *Suppl.* p. 786 (see synon.).

B. vi. P. 15. L. l. 47. L. tr. $3\frac{1}{2}/10$.

Length of head $3\frac{3}{4}$ to 4, height of body 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $1\frac{1}{2}$ from end of snout, and nearly 1 apart. Preopercle entire. Opercle with a small flat spine. *Teeth*—4 large curved canines in either premaxillary, and a small lateral outer conical row; 6 well-developed canine-like teeth in front third of lower jaw, laterally a conical row, becoming small in last fourth of jaw. *Fins*—dorsal interspinous membrane very slightly emarginate, spines increase in length to fifth, then continue of about the same height to the last, which is a little longer; rays longer than spines. Pectoral not extending to above anal. Caudal forked, upper lobe the longer. *Colour*—rosy, with a brilliant spot on the first five scales below the lateral line, the upper half red, the lower yellow. Five or six longitudinal yellow bands, and three silvery-white bands below the lateral line; fins pinkish, with a yellow band along the base of the dorsal and anal.

Hab. Seas of India.

22. Genus PENTAPUS, Cuv.

Syn. *Leiopsis*, Bennett; *Gnathodentex*, pt., Bleeker.

Branchiostegals six; pseudobranchiæ. Body oblong. Eyes of medium size. Cleft of mouth more or less horizontal and not deep; jaws of about equal length. Preopercle entire; opercle without any or with a very feeble spine; preorbital narrow, entire; the distance between the eye and the mouth small. Villiform teeth in the jaws with canines; palate edentulous. One scaleless dorsal fin receivable into a groove at its base, having ten spines; anal with three spines; caudal forked. Scales ctenoid, of moderate or

small size, with three or more rows on the preopercle. Air-bladder simple. Pyloric appendages few.

Geographical Distribution. Seas of India to Australia.

708. (1.) **Pentapus aurolineatus.**

Sparus aurolineatus, *Lacép. H. N. Poiss.* iv, p. 132.
Pentapus aurolineatus, *Day, Fish. India*, p. 93.

D. 10/10. P. 16. A. 3/9–10. C. 17. L. l. 74–78. L. tr. 6/20.

Length of head 4 to $4\frac{1}{3}$, height of body $3\frac{1}{2}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{3}{4}$ from end of snout, and 1 apart. A serrated ridge outside middle portion of upper two thirds of maxilla. *Teeth*—about six canines in front of each jaw, the outer pair enlarged. *Fins*—dorsal spines rather weak, increasing in length to the fourth, which is two fifths the height of the body, the hinder ones are a little shorter, the rays are rather higher than the spines, interspinous membrane slightly notched; pectoral nearly as long as the head; ventral nearly reaches the anal. Anal spines not strong, third the longest but not quite equal to fourth dorsal; caudal deeply forked. *Colour*—silvery, with four or five horizontal golden bands along the sides, and a silvery mark on the back behind last dorsal ray; fins rosy, the dorsal, caudal, and anal being margined with red.

Hab. Mauritius, Ceylon to the Malay Archipelago, and beyond.

23. Genus **APHAREUS**, Cuv. & Val.

Branchiostegals seven; pseudobranchiæ. Body oblong. Cleft of mouth wide and oblique, the lower jaw the longer. Preopercle and preorbital entire. Canines absent, palate edentulous. A single dorsal fin, with the front portion the highest, spines (10–12) feeble; caudal forked. Scales small. Air-bladder simple. A respiratory cavity behind the branchiæ. Pyloric appendages few.

709. (1.) **Aphareus rutilans.**

Aphareus rutilans, *Cuv. & Val. H. N. Poiss.* vi, p. 490; *Day, Fish. India, Suppl.* 1888, p. 782 (see synon.).

D. 10–12/9–11. P. 16. A. 3/8. C. 17. L. l. 65–70. Cæc. pyl. 5.

Length of head 4, height of body $4\frac{3}{4}$ to 5 in the total length. *Eyes*—diameter 4 in length of head, $1\frac{1}{4}$ from end of snout, and 1 apart. *Fins*—fourth and fifth dorsal spines the highest in the fin, last dorsal and anal rays prolonged to twice the length of the penultimate; caudal deeply forked. *Colour*—rosy, deepest along the back, with a yellow blotch between each two rays of the dorsal fin near their bases. Caudal lobes with dark tips.

Hab. Red Sea to the Malay Archipelago; obtained in Ceylon by Mr. Haly.

24. Genus SMARIS, Cuv.

Branchiostegals six; pseudobranchiæ. Mouth very protractile. Preopercle entire. Teeth in the jaws, none on the vomer. A single, sometimes deeply notched scaleless dorsal fin, with from nine to fifteen feeble spines; anal with three. Caudal forked. Scales ctenoid, rather small. Air-bladder not constricted, but generally forked posteriorly. Pyloric appendages few.

Geographical Distribution. Mediterranean and Atlantic Ocean; one species from Ceylon.

710. (1.) Smaris balteatus.

Smaris balteatus, *Cuv. & Val. H. N. Poiss.* vi, p. 424; *Day, Fish. India*, p. 94 (see synon.).

D. 15/10. P. 17. V. 1/5. A. 3/10.

Length of head $4\frac{1}{4}$, height of body 4 in the total length. *Eyes*—diameter $2\frac{2}{3}$ in length of head, $\frac{2}{3}$ of a diameter from end of snout. Body cylindrical and somewhat elongate; the maxilla reaches to below front edge of orbit. *Fins*—division between spinous and soft portions of dorsal well marked. *Colour*—reddish brown along back, dotted with small brilliant silvery spots; the coloured part of the back streaked with brilliant silver, below this coloured portion a wide silvery longitudinal band passes from the superciliary region across the opercle to the tail. Fins pale-coloured.

Hab. Ceylon; growing to 4 inches in length.

25. Genus CÆSIO, Lacépède.

Syn. *Cæsio*, sp., Cuv. & Val.; *Paracæsio*, Bleeker; *Odontonectes*, Günther.

Branchiostegals six or seven; pseudobranchiæ. Body oblong, occasionally somewhat elevated. Mouth moderately protractile, its cleft oblique. Preopercle entire or minutely serrated. Fine teeth in the jaws, sometimes deciduous ones on the vomer or palate. A single dorsal fin, with from 9 to 13 feeble spines; anal with 3. Scales very finely ctenoid, of moderate or small size, and as a rule extended over the bases of the vertical fins. Air-bladder not constricted.

Geographical Distribution. From the Red Sea, through the seas of India to the Malay Archipelago.

Synopsis of Indian Species.

D. 11/14, L. tr. 9/18 .... 1. *C. pinjalo*, p. 532.
D. 10/15, L. tr. 7/13. Bluish green above, rosy below .... 2. *C. cuning*, p. 532.
D. 10/15, L. tr. 8/16. A golden longitudinal band .... 3. *C. chrysozona*, p. 533.

711. (1.) **Cæsio pinjalo.** (Fig. 160.)

Cæsio pinjalo, *Bleeker, Batavia Nat. Tijdsch.* i, p. 10; *Day, Fish. India,* p. 94, pl. xxiv, fig. 4 (see synon.).

Polei-oolavai, Mette mirrei, Tamil.

B. vii. D. 11/14. A. 3/10. C. 17. L. l. 50–55. L. tr. 9/18.

Length of head $4\frac{1}{2}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ to 4 in length of head, $\frac{3}{4}$ to 1 from end of snout, and also apart. Body oval and compressed. Lower jaw the longer. Vertical limb of preopercle serrated, most coarsely so at the angle, which is considerably produced. Opercle with a weak, flat spine. *Teeth*—villiform, with one or two, sometimes three, small conical ones on either side of middle of upper jaw, in a narrow band in a Λ-form on vomer, and also on palatines, occasionally absent from both the latter. *Fins*—dorsal spines weak, fourth and fifth the highest, from these they slightly decrease to the last, which

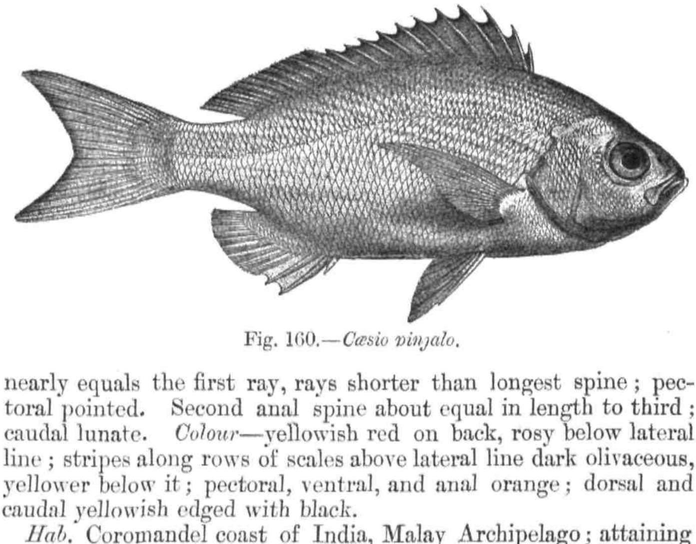

Fig. 160.—*Cæsio pinjalo.*

nearly equals the first ray, rays shorter than longest spine; pectoral pointed. Second anal spine about equal in length to third; caudal lunate. *Colour*—yellowish red on back, rosy below lateral line; stripes along rows of scales above lateral line dark olivaceous, yellower below it; pectoral, ventral, and anal orange; dorsal and caudal yellowish edged with black.

Hab. Coromandel coast of India, Malay Archipelago; attaining at least 16 inches in length.

712. (2.) **Cæsio cuning.**

Sparus cuning, *Bloch, Ich.* t. 263, fig. 1.
Cæsio cuning, *Day, Fish. India,* p. 95 (see synon.).

Cul kilchi, Tamil.

B. vi. D. 10/15. A. 3/11. L. l. 53. L. tr. 7/13. Vert. 10/14. C. pyl. 5.

Length of head $4\frac{3}{4}$ to 5, height of body $3\frac{1}{3}$ to $3\frac{3}{4}$ in the total length. *Eyes*—diameter 4 in length of head, $\frac{3}{4}$ to 1 from end of snout, and $1\frac{1}{2}$ apart. Preopercular angle rounded and finely

serrated. *Teeth*—small on vomer, and deciduous on palatine bones. *Fins*—4th dorsal spine longest; 2nd and 3rd anal spines nearly equal; caudal deeply forked. *Colour*—bluish green above, rosy along abdomen.

Hab. Seas of India to the Malay Archipelago and beyond.

713. (3.) **Cæsio chrysozona.**

Cæsio chrysozona (*Kuhl & v. Hass.*), *Cuv. & Val. H. N. Poiss.* vi, p. 440; *Day, Fish. India*, p. 95, pl. xxiv, fig. 5 (var. *aurolineatus*) (see synon.).

Peroom kilché and *Woongooni*, Tam.

B. vi. D. 10/14–15. A. 3/11–15. C. 15. L. l. 65–72. L. tr. 8/16.

Length of head $4\frac{1}{4}$, height of body $4\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ in the young to $3\frac{2}{3}$ in adult in length of head, $\frac{1}{2}$ to 1 from end of snout, $\frac{3}{4}$ apart. Body rather elongate and compressed. Lower jaw the longer. Preopercle striated and irregularly serrated on both edges; in the adult the angle is rather produced. Opercle with a moderate spine. *Fins*—3rd and 4th dorsal spines longest, equal to half height of body; rays of about equal length. Pectoral reaching to opposite anus. Second anal spine slightly shorter than third, which equals second dorsal. Caudal deeply lobed, the lower lobe largest and longest. *Scales*—a few rows along bases of dorsal and anal. *Colour*—bluish, with a golden band along the lateral line and a black tip to each lobe of caudal; a black spot in axilla. In the var. *C. aurolineatus*, above the lateral line is light lake-colour; from eye to base of caudal below lateral line there is a shining golden band, 3 scales deep in front, decreasing to one behind; below this band pinkish white.

Hab. Red Sea, seas of India.

26. Genus **APRION**, Cuv. & Val.

Branchiostegals seven; pseudobranchiæ. Body oblong, rather elongate, and compressed. Preorbital of moderate height, entire. Preopercle entire or finely serrated. Opercle with two spines. Villiform teeth on the vomer and palate and in both jaws, canines in front, and an outer enlarged row laterally; none on the tongue. Dorsal fin single, with ten or eleven spines; anal with three; pectorals pointed; caudal rather deeply forked. Scales of moderate size. Pyloric appendages few.

Geographical Distribution. Red Sea, seas of India and Malaysia, also Seychelles and Madagascar.

714. (1.) **Aprion pristipoma.** (Fig. 161.)

Dentex pristipoma, *Bleeker, Batavia Nat. Tijdsch.* vii, p. 246.
Anthias multidens, *Day, Fish. India*, p. 27, pl. vii, fig. 4, *Suppl.* p. 782 (see synon.).

D. 10/11. P. 16. A. 3/8-9. C. 16. L. l. 52. L. tr. 7/17. Cæc. pyl. 5.

Length of head $3\frac{3}{4}$, height of body 4 in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, $1\frac{1}{4}$ from end of snout, and 1 apart. Seven rows of scales between eye and angle of the preopercle. *Fins*—dorsal spines slender, 5th longest; last dorsal and anal ray nearly twice as long as the preceding; second anal spine

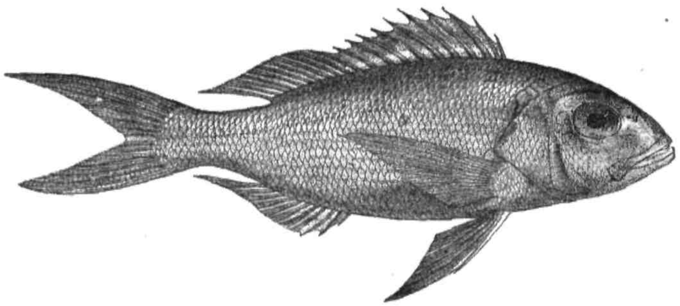

Fig. 161.—*Aprion pristipoma.*

strongest, third longest. *Colour*—rosy, with about six longitudina yellow bands along the body, a golden one from inferior angle of eye to snout, and another across the forehead.

Hab. Red Sea to Malay Archipelago and New Guinea; attaining a large size. Common at the Andamans.

Eighth group. GERRINA.

27. Genus **DATNIOIDES**, Bleeker.

Branchiostegals six; pseudobranchiæ. Body elevated. Premaxillaries very protractile. Preopercle serrated. Villiform teeth in the jaws without canines; vomer, palate, and tongue edentulous. A single dorsal fin having 12 stout spines; anal with 3. Scales ctenoid. Air-bladder simple. Pyloric appendages few.

Geographical Distribution. Mouths of large rivers from India to the Malay Archipelago. Rarely found beyond tidal reach.

715. (1.) **Datnioides quadrifasciatus.** (Fig. 162.)

Chætodon quadrifasciatus, *Sevastian, Mém. Acad. Péters.* 1809, i. p. 448, t. 18.
Datnioides polota, *Bleeker, Batavia Nat. Tijdsch.* v, p. 441; *Day, Fish. India*, p. 96, pl. xxiv, fig. 6, *Suppl.* p. 786 (see synon.).

Nya-kya and ***Nga-wet-ma***, Burm.; ***Nga-pree-gryn*** and ***Nga-thak-how***, Arrac.; ***Beydha***, Chittagong.

D. 12/13–14. A. 3/8–9. L. l. 48. L. r. 72/60. L. tr. 12/25. C. pyl. 5.

Length of head 3 to $3\frac{1}{2}$, height of body $2\frac{1}{4}$ to 3 in the total length. *Eyes*—diameter 5 in length of head, $1\frac{1}{2}$ from end of snout, and 1 apart. *Fins*—every alternate dorsal spine thickened on one side, 5th and 6th the longest; second anal spine longest, equalling highest in dorsal; caudal rounded. *Colour*—brownish, glossed

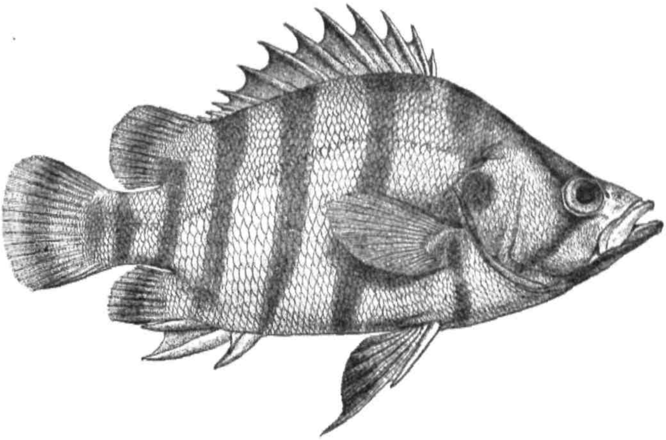

Fig. 162.—*Datnioides quadrifasciatus.*

with copper; six or seven narrow vertical brown bands on body and others radiating from orbit.

Hab. Estuaries of the Ganges, rivers of Burma and the Malay Archipelago; attaining at least 1 foot in length. Though not esteemed as food it is eaten by the poorest classes.

28. Genus GERRES, Cuvier.

Syn. *Diapterus*, Ranz; *Chanda*, sp., Ham. Buch.; *Catochænum*, Cantor; *Synistius*, Gill; *Eucinostomus*, Baird, Gir.

Branchiostegals six; pseudobranchiæ. Body elevated or oblong and compressed. Mouth very protractile and descending when produced. Preopercle as a rule entire, rarely serrated. Eyes comparatively large. Villiform teeth in the jaws; no canines. Inferior pharyngeal bones firmly united by a suture in some species but not so in others *. Bases of the spinous and soft portions of the dorsal fin nearly equally long, the whole fin having a scaly sheath into which it can be wholly or partially received; pectorals long, pointed, generally reaching to above the anal. D. 9–10/10–11. A. 3/7. Caudal forked. Scales of moderate size. Air-bladder simple. Pyloric appendages few.

* Peters, MB. Ak. Wiss. Berlin, 1868, p. 257.

Geographical Distribution. All tropical seas, entering estuaries. Some species apparently are mostly confined to the latter, and ascend into brackish or fresh water as high as tidal influence extends.

Uses. These fishes are eaten by the indigent classes, being little esteemed whilst fresh. As they salt and dry well, large numbers are prepared in this manner for use.

Synopsis of Indian Species.

A. Dorsal with 10 spines .... 1. *G. setifer*, p. 536.
B. Dorsal with 9 spines.
  a. Height of body 4 in total length ...... 2. *G. oblongus*, p. 536.
  b. Height of body $2\frac{1}{2}$ to $3\frac{1}{2}$ in total length.
    a'. Longest dorsal spine prolonged, exceeding height of body .... 3. *G. filamentosus*, p. 537.
    b'. Longest dorsal spine moderate, less than height of body, but much exceeding longest anal.
      L. tr. 5/10. Longest dorsal spine as long as head without snout ...... 4. *G. oyena*, p. 538.
      L. tr. 6/11. Longest dorsal spine almost as long as head .... 5. *G. abbreviatus*, p. 538.
      L. tr. 6/11. Longest dorsal spine as long as head without snout ...... 6. *G. poeti*, p. 538.
    c'. Longest dorsal spine scarcely, or not longer than longest anal.
      L. tr. 5/10. Indistinct vertical bands 7. *G. lucidus*, p. 539.
      L. tr. 4/10. No bands .... 8. *G. limbatus*, p. 539.

716. (1.) Gerres setifer.

Chanda (?) setifer, *Ham. Buch. Fish. Ganges*, pp. 105, 370.
Gerres setifer, *Day, Fish. India*, p. 97, pl. xxv. fig. 1, *Suppl.* p. 786 (see synon.)

D. 10/10. P. 17. A. 3/7. C. 19. L. l. 38. L. tr. 5/10.

Length of head 4 to $4\frac{1}{4}$, height of body $2\frac{1}{2}$ to 3 in the total length. *Eyes*—diameter 3 in length of head, nearly 1 from end of snout, and 1 apart. Lower margin of preopercle serrated in its last half. *Fins*—dorsal spines moderate, third and fourth longest and two fifths height of body; last dorsal spine rather longer than the preceding, and one third shorter than the third or fourth. Anal spines of about equal length, or the second slightly the longer; caudal deeply forked. *Colour*—silvery, with a narrow dark edge to the dorsal interspinous membrane, and a brown spot on each dorsal ray just above the sheath.

Hab. River Hooghly at Calcutta, where this fish is common, attaining to $4\frac{1}{2}$ inches in length; also Madras.

717. (2.) Gerres oblongus.

Gerres oblongus, *Cuv. & Val. H. N. Poiss.* vi, p. 479; *Day, Fish. India*, p. 98, pl. xxv, fig. 2 (see synon.).

D. 9/10. P. 17. A. 3/7. C. 17. L. l. 48–50. L. tr. $5\frac{1}{2}$/—.

Length of head $4\frac{1}{3}$, height of body nearly 4 in the total length. *Eyes*—diameter 3 in length of head, $\frac{3}{4}$ (in the young 1) from end of snout, and 1 apart. Preopercle entire. *Fins*—dorsal spines not very strong, compressed, the second curved and much the highest, being almost as long as the head; anal spines weak, the third rather the longest; caudal deeply forked, with some fine scales upon it. *Colours*—silvery, eye golden.

Hab. Apparently throughout the seas of India to the Malay Archipelago and beyond. The young are sometimes captured at Madras; I have also taken this fish at the Andaman Islands, up to a little over 9 inches in length.

718. (3.) **Gerres filamentosus.** (Fig. 163.)

Gerres filamentosus, *Cuv. & Val. H. N. Poiss.* vi, p. 482; *Day, Fish. India*, p. 98, pl. xxv, fig. 3 (see synon.).

Jaggari, Tel. (Ganjam); *Oodan*, Tam.; *Nga zeeng byoo*, Arrac.

D. 9/10. P. 15. A. 3/7. L. l. 45–48. L. tr. 6/14. Cæc. pyl. 3.

Length of head 4 to $4\frac{1}{4}$, height of body rather above 3 in the total length. *Eyes*—diameter 3 in length of head, $\frac{4}{5}$ to 1 from end of snout and also apart. Preopercle entire. *Fins*—2nd dorsal spine prolonged, sometimes, especially in the adult, extending to the caudal fin; second anal spine stronger but shorter than third; caudal deeply forked. *Colour*—silvery in the adult, with rows of

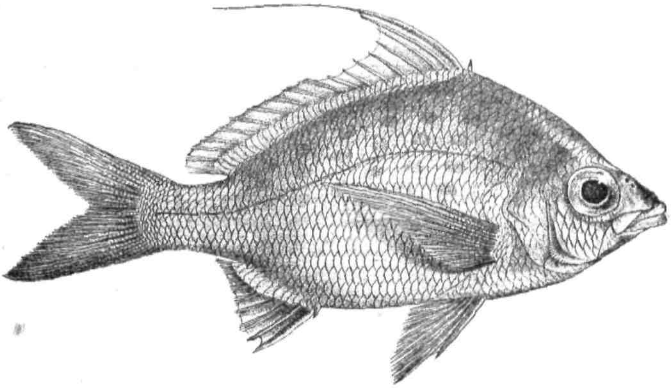

Fig. 163.—*Gerres filamentosus.*

short oblong horizontal bluish spots along the upper half of the body, on the scales being rubbed off the spots are found to be continuous, forming lines; snout black; a blackish spot anteriorly on the base of each dorsal spine and ray just above the scaly sheath, and usually a dark edge to the soft dorsal; caudal greyish externally; the other fins yellow, with numerous fine dots on the fin-

membrane. The *young* have vertical bands, the alternate ones being the shortest.

Hab. Seas of India to the Malay Archipelago and beyond; attaining 8 inches or more in length.

719. (4.) Gerres oyena.

Labrus oyena, *Forsk. Descr. Anim.* p. 35.
Gerres oyena, *Day, Fish. India*, p. 99, pl. xxv, fig. 4 (see synon.).

D. 9/10. P. 15. A. 3/7. C. 19. L. l. 38–40. L. tr. 5/10. C. pyl. 3.

Length of head 4, height of body $2\frac{3}{4}$ in the total length. *Eyes*—diameter $3\frac{1}{2}$ in length of head, 1 from end of snout and also apart. Preopercle roughened along its vertical limb but not serrated. *Fins*—dorsal spines pretty strong, the anterior somewhat compressed, the second longest and equal to nearly the length of the head without the snout. Second anal spine strongest, but shorter than the third, which equals half the length of the head; caudal forked. *Scales*—fine ones covering the caudal fin. *Colour*—silvery; dorsal fin black-edged, and a dark spot on each spine and ray at about half their height; sometimes a darkish mark over the free portion of the tail; a narrow black posterior edge to the middle of the caudal; the fins yellow.

Hab. Red Sea, east coast of Africa, seas of India to the Malay Archipelago and beyond.

720. (5.) Gerres abbreviatus.

Gerres abbreviatus, *Bleeker, Batavia Nat. Tijdsch.* i, p. 103; *Day, Fish. India*, p. 99, pl. xxv, fig. 6 (see synon.).

D. 9/10. P. 15. A. 3/7. C. 17. L. l. 37–40. L. tr. 6/11.

Length of head 4, height of body $2\frac{1}{2}$ to $2\frac{2}{3}$ in the total length. *Eyes*—diameter $2\frac{1}{2}$ to 3 in length of head, $\frac{2}{3}$ to $\frac{3}{4}$ from end of snout, and 1 apart. Snout somewhat spatulate. Preopercle entire or finely serrated on its vertical limb. No median suture between the inferior pharyngeal bones. *Fins*—second dorsal spine longer than the third, and almost equal to the length of the head, both rather curved. Second anal spine the strongest, the third slightly the longest, as long as the distance from the posterior edge of the orbit to the end of the snout; caudal deeply forked, upper lobe slightly the longer. *Colour*—silvery white, darkest along the back, each scale with a rather indistinct spot, forming longitudinal bands; fins yellowish, dorsal with a blackish edge and a spot on each spine and ray just above the sheath.

Hab. Seas of India to the Malay Archipelago; growing to $7\frac{1}{2}$ inches in length.

721. (6.) Gerres poeti.

Gerres poeti, *Cuv. & Val. H. N. Poiss.* vi, p. 468; *Day, Fish. India*, p. 100, pl. xxv, fig. 1 (see synon.).

Mungav, Maráthi.

D. 9/10. P. 15. A. 3/7. C. 17. L. l. 40. L. tr. 6/11.

Length of head $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{2}{3}$ from end of snout, and 1 apart. *Fins*—the second and third dorsal spines compressed and somewhat arched, the second slightly the longer, and equal to the length of the head excluding the snout. Second anal spine the strongest, and differing but little in length from the third, which is three fourths of the height of the second dorsal; caudal forked. *Colour*—silvery, with a dark edge to the dorsal fin, and the outer edge of the caudal greyish; spots along the base of each dorsal spine and ray, and more or less distinct lines along the rows of scales on the body.

Hab. Red Sea, east coast of Africa, seas of India, Malay Archipelago, and beyond; growing to at least 7 inches in length.

722. (7.) Gerres lucidus.

Gerres lucidus, *Cuv. & Val. H. N. Poiss.* vi, p. 477; *Day, Fish. India*, p. 99, pl. xxv, fig. 5 (see synon.).

D. 9–10. P. 15. A. 3/7. C. 17. L. l. 40. L. tr. 5/10. Cæc. pyl. 3.

Length of head $4\frac{1}{2}$, height of body 3 in the total length. *Eyes*—diameter $2\frac{1}{2}$ in length of head, $\frac{1}{3}$ to $\frac{2}{3}$ from end of snout, and 1 apart. Preopercle entire. *Fins*—dorsal spines of moderate strength, the third slightly the longest, equal to length of head behind middle of orbit; second anal spine stronger, but generally rather shorter than third, which is a little longer than the third dorsal; caudal forked. *Scales*—dorsal sheath rather more developed than anal; a few scales over the caudal. *Colour*—silvery, an indistinct vertical dark band over the nape, and three more below the dorsal fin; snout black; fins canary-yellow, dorsal dark-edged with a black margin; a row of dark spots along the dorsal spines and rays at half their height; caudal grey-edged, the inferior caudal lobe with a very narrow white lower edge and a white tip.

As this fish increases in length the height of the body diminishes proportionately.

Hab. Seas of India to the Malay Archipelago and China. This is the most common Indian species, visiting the coasts in enormous numbers.

723. (8.) Gerres limbatus.

Gerres limbatus, *Cuv. & Val. H. N. Poiss.* vi, p. 476; *Day, Fish. India*, p. 100 (see synon.).

Nga-wet-sat, Arracan.

D. 9/10. P. 15. A. 3/7. C. 17. L. l. 35. L. tr. 4/10.

Length of head 4, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter 3 in length of head, $\frac{2}{3}$ from end of snout, and 1 apart. *Fins*—dorsal spines not very strong, the third slightly the longest,

and equal to length of head behind middle of orbit, the last spine nearly equal to half the height of the rays; second anal spine much the strongest, but slightly shorter than third, which nearly equals second dorsal; caudal deeply forked. *Scales*—numerous fine scales over caudal fin. *Colour*—silvery, with a dark margin to the dorsal and anal fins, and a spot on each spine and ray of the dorsal fin about its middle.

Hab. Seas of India; 5 inches in length.

29. Genus **PENTAPRION**, Bleeker.

Syn. *Clara*, Gill.

This genus has the inferior pharyngeal bones separate, and differs from *Gerres* in possessing 14 or 15 rays in the dorsal fin; 5 anal spines, and 13 or 14 rays.

724. (1.) **Pentaprion longimanus.** (Fig. 164.)

Equula longimanus, *Cantor, Catal.* p. 152 (*J. A. S. B.* xviii, p. 1134).
Pentaprion longimanus, *Day, Fish. India*, p. 101, pl. lii, fig. 6 (see synon.).

B. vi. D. 9–10 (11)/(14) 15–16. P. 15. A. 5/13. C. 17. L. l. 40.

Length of head $4\frac{1}{3}$, height of body $3\frac{1}{4}$ in the total length. *Eyes*—diameter $2\frac{1}{3}$ in length of head, $\frac{2}{3}$ from end of snout, and 1 apart.

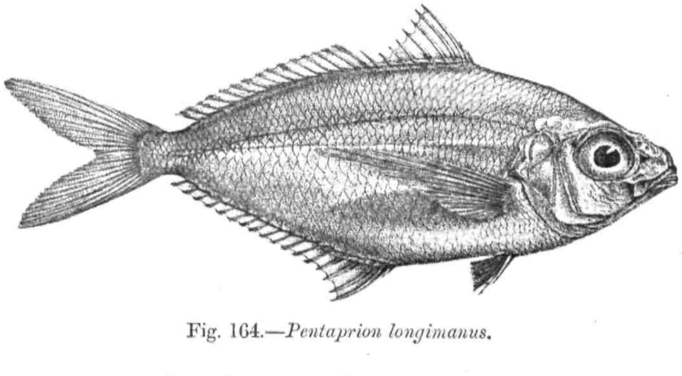

Fig. 164.—*Pentaprion longimanus.*

Lower preopercular edge serrated. *Teeth*—villiform in the jaws; vomer and palate edentulous. *Fins*—dorsal spines weak, the first very short, the second one-third the height of the third; second anal spine the longest; upper caudal lobe the longer. *Colour*—silvery, with a silvery stripe from the eye to the base of the caudal fin.

Hab. Madras to the Malay Archipelago.

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PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.